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BUFFALO

OCTOBER 6, 1956
VOL. 151—NO. 14

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

Guaranteed Circulation This Issue
11,358 of Which 10,828 is Paid

TRANSATLANTIC CABLE

Transatlantic cable, cut in service on Sept. 25, was stored in four tanks on Cableship Monarch, one of which is pictured above. Ship carries about 2,000 miles of cable at one time. See page 20 for story of cable project.

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FLASHES AND PLUGS

LOCAL COLOR. Bell Telephone Co. of Canada's *Blue Bell* reports that in Japan, public telephones play a particularly important role, for the supply of subscriber facilities is far behind demand. "Telephone Houses" are being constructed, each house containing booths for local calls and five booths for long distance calls.

Newly-designed semi-public telephones, coloured red and installed in drugstores and tobacco shops, have so appealed to the public that they are referred to as "Aka-Denwa"—pretty little dolls.

Streamlined booths, installed in Tokyo's busy streets, have light grey bodies and red tops. They are popularly known as "Tancho" —red heads.

•

COMMUNICATION, INDIRECT METHOD. The brakeman on a freight train spotted a fire as his train rolled through Hartford, Conn., reported the United Press on Sept. 10.

He scribbled a note, dropped it to a gate tender. The gateman shouted to employes in a nearby plant, who telephoned the fire department which put out the fire.

•

POOR LITTLE SHEAFFER. (*Pacific Telephone Magazine* had such an inspired headline for this one that we thought it worth passing on undisturbed.)

A doctor had an urgent call from a man who reported that his small son had sucked all the ink out of a fountain pen and swallowed it.

"All right, I'll come over at once," replied the doctor, "What have you been doing in the meantime?"

"Using a pencil."

•

SNACKFEST IN BED. In Hot Springs, Va., Mr. and Mrs. James Culpeper checked to see how their eight-year-old son Jimmy was faring in the adjoining hotel room—his first experience with his own private room. It was 11 p.m.

They heard the click of the telephone receiver, and Jimmy's authoritative voice:

"Room service? I'll have a double chocolate milk shake. Rush that, please."

•

TRUST CASE. It happened in Pittsburgh. A local woman who called up a television station to notify it she had located a dollar bill with a "lucky" serial number was dismayed to learn she had to bring it to the station to collect her prize.

"Why I copied down the serial number and then spent the dollar," she told the station, indignantly. "I was sure you'd take my word for it."

CIRCULATION

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THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

October 6, 1956

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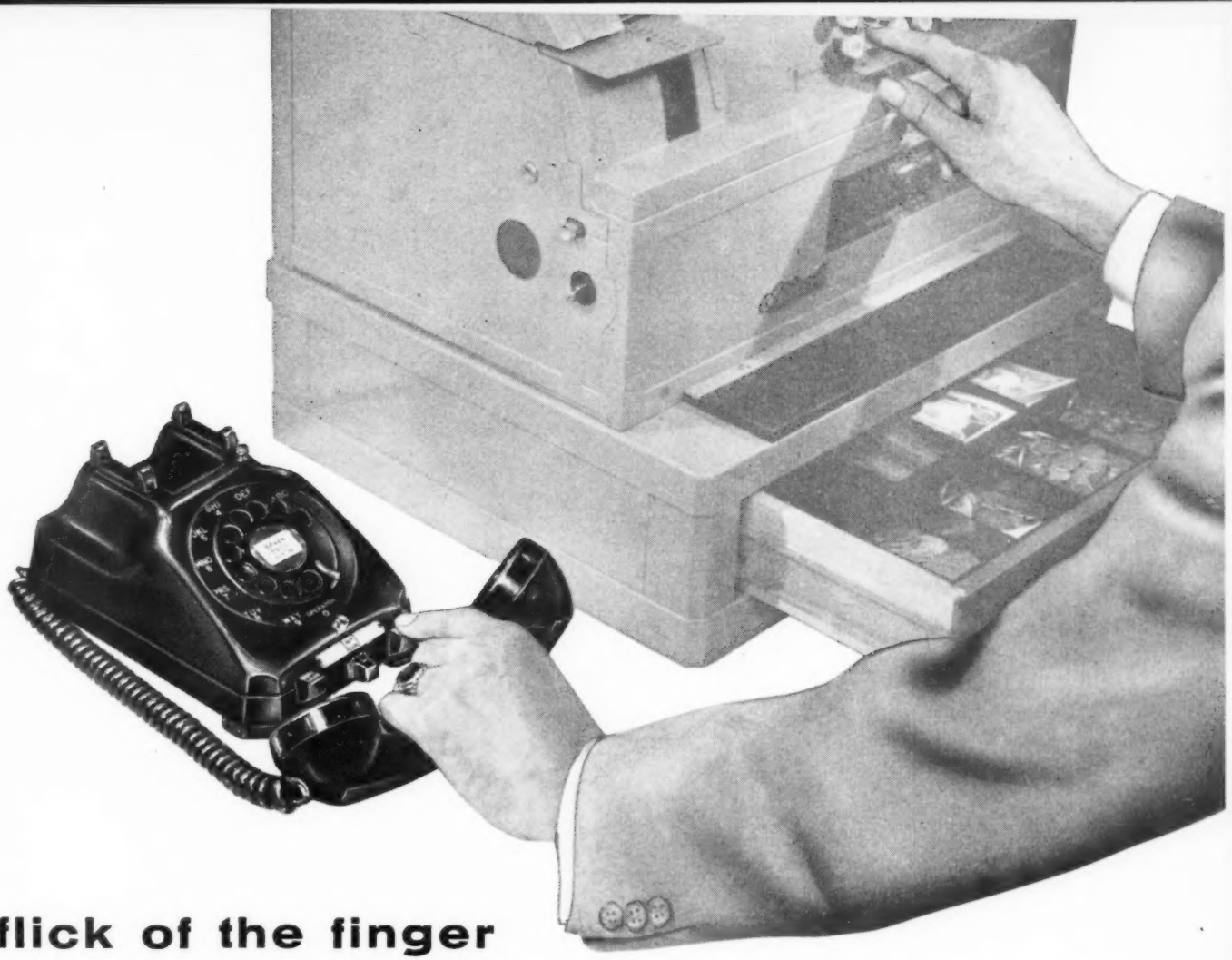

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Call comes in on trunk line A. Subscriber flicks switch to proper position and lifts receiver to answer call.

During conversation line B rings. Subscriber asks caller on A to wait, then presses Hold button. Flicking switch to right, he answers call on line B.

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Subscriber reconnects with held calls by pushing switch to proper position. He completes both calls without asking anyone to call back or using more than one 'phone.

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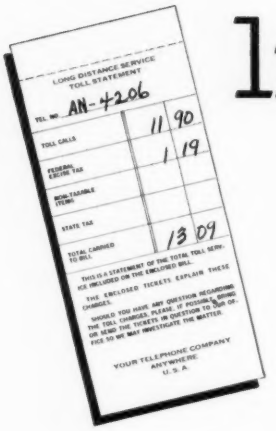
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TEL. NO. AN-4206
TOLL CALLS 11 90
FEDERAL EXCISE TAX 1 19
NON-TAXABLE ITEMS
STATE TAX
TOTAL CARRIED TO BILL 13 09
THIS IS A STATEMENT OF THE TOTAL TOLL SERVICE INCLUDED ON THE ENCLOSED BILL.
THE ENCLOSED TICKETS EXPLAIN THESE CHARGES.
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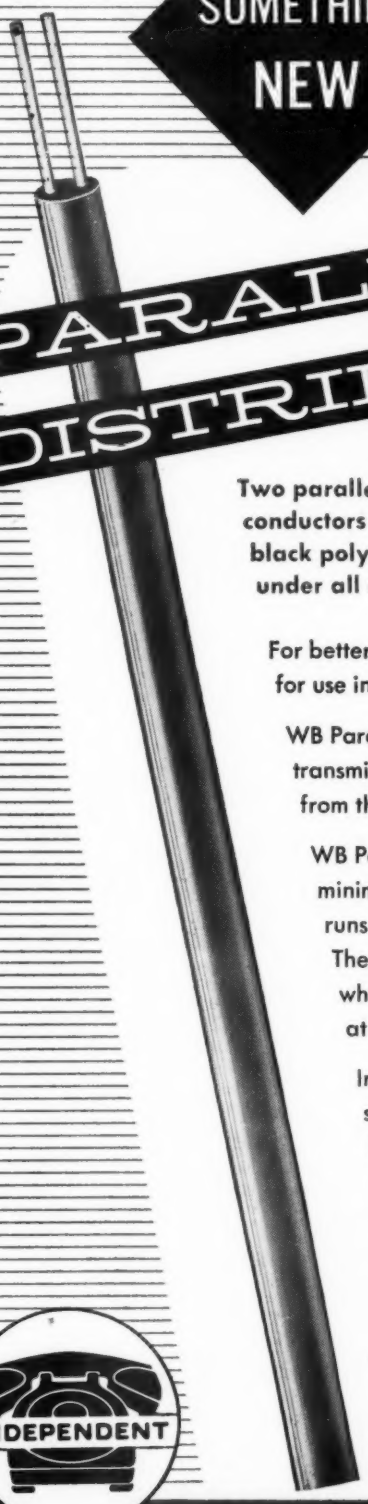

Two parallel extra high strength Copperweld conductors insulated with WB special tough, black polyethylene compound for long life under all conditions.

For better service and greater economy WB Parallel Distribution Wire is designed for use in rural areas in place of open wire.

WB Parallel Distribution Wire gives better service because it provides better transmission qualities and its tough polyethylene jacket protects the conductors from the many conditions that harm open wire.

WB Parallel Distribution Wire is economical because it can be installed with minimum labor, the need for cross arms is eliminated. It may be used to extend runs of rural distribution wire where only one, two, or three pairs are required. The extra high strength Copperweld conductor permits long span construction which also makes this wire ideally suited for drop runs to service subscribers at distances from main pole lines.

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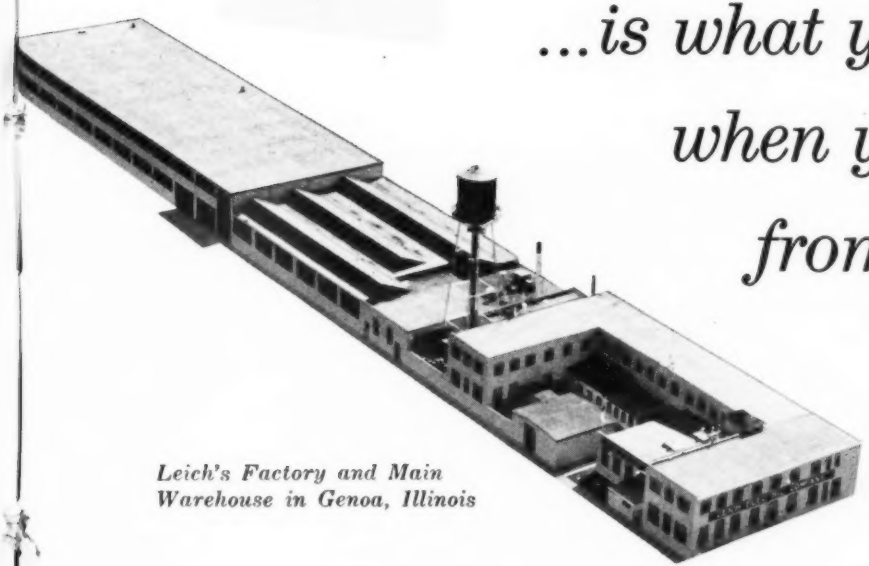

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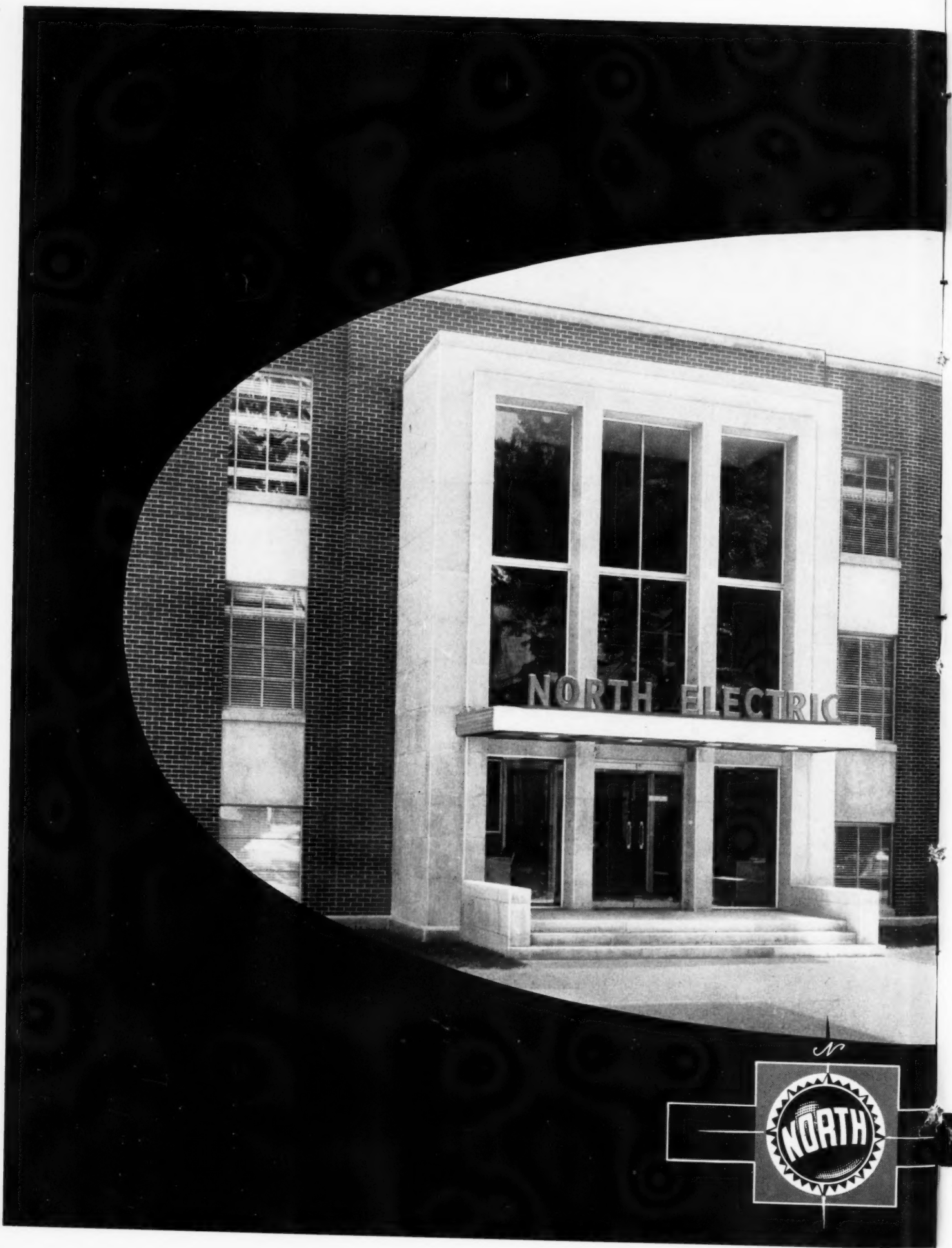

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NORTH EXPANDS FOR CONTINUING LEADERSHIP

During the past 18 months, NORTH ELECTRIC COMPANY has embarked on an expansion program designed to maintain NORTH'S position of leadership in the manufacture of equipment for the growing Independent Telephone Industry.

The accomplished, tangible results of that expansion have already made themselves apparent in new manufacturing facilities, increased production, new product development, a vastly broadened research program, and newly improved service to the entire industry!

Since the summer of 1955, NORTH has completed its new administration building which now houses the executive, general and sales offices, the engineering and development sections, and the testing and research departments.

New plant additions at the Galion Main Plant have added over 50% more additional space for expanded production facilities.

Millions have been invested in machinery, tools, and equipment.

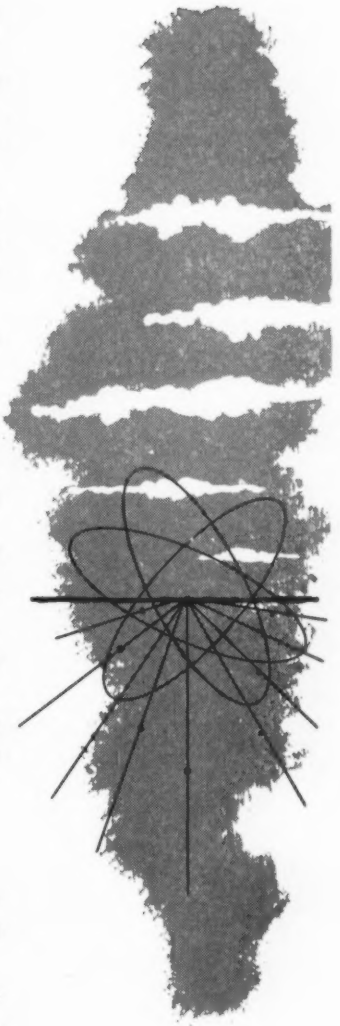
Two new warehouses, one in Salem, Oregon, the other in Lakeland, Florida, have been opened to provide added distribution and service facilities.

The Dallas, Texas, warehouse has been moved to provide additional space to meet the distribution and service requirements in its area.

During these past 18 months, NORTH has introduced the first perfected and approved By-Path Crossbar switching system available to the Independent Telephone Industry.

During this same period, NORTH has also introduced its divided ringing Subscriber Carrier, and other new telephone equipment.

At the USITA Convention, October 15-17, NORTH will show, for the first time, a new product that will revolutionize the thinking of the entire industry, *and the thinking of every telephone user!*



These things have been accomplished

They represent the result of NORTH leadership since 1884!

What is more important is the future growth of the Independent Telephone Industry and the leadership with which NORTH will pace this future growth.

Growth, expansion, leadership — all are intangible terms — their meaning, and their accomplishment, depends on the creative thinking and planning of human minds.

This creative thinking and planning is being done at NORTH. The future presents both a challenge and a promise! NORTH is thinking and planning to meet the challenge — thinking and planning to fulfill the promise!

For continuing leadership — for the fulfillment of the promise, and the answer to the challenge — for the future — look to NORTH ELECTRIC COMPANY!

NORTH ELECTRIC COMPANY

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Leading the independent telephone industry since 1884

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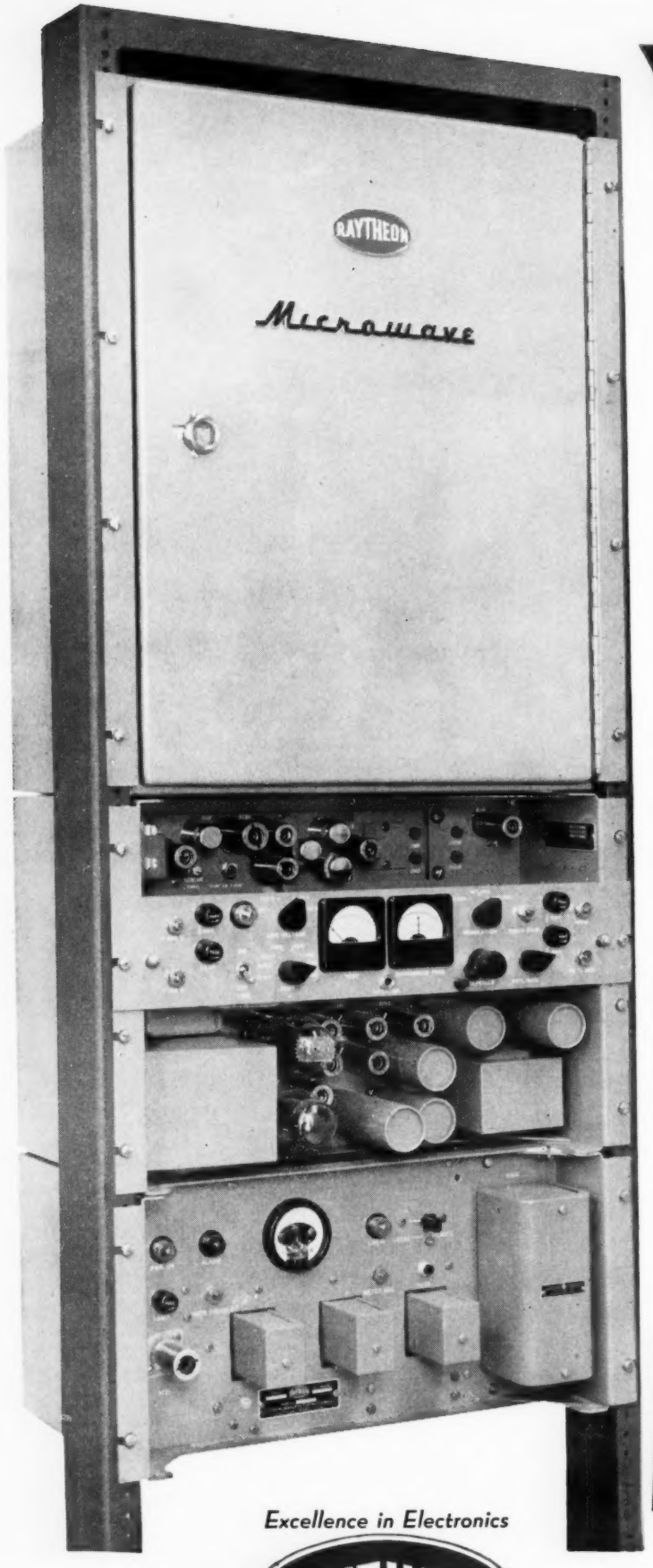

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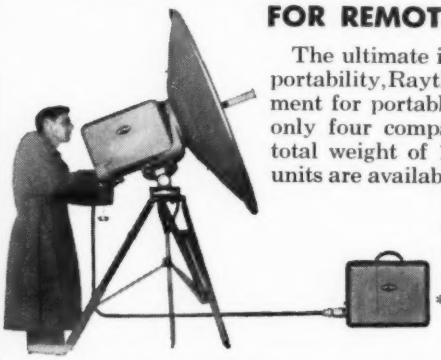

The ultimate in simplicity and portability, Raytheon KTR equipment for portable use consists of only four compact units with a total weight of 162 lbs. Portable units are available for all bands—color or monochrome with audio channel—if desired.

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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

Trend toward reduction of number of farms should be considered and studied by telephone industry. Increase in social calls to Europe seen as result of transatlantic cable.... Should mean greater traffic of this type for Independent companies. Two large independent unions plan merger.

REGARDLESS of the outcome of the current political campaign, the discussions by both sides have brought to the forefront an economic problem which is going to be with us a long time. And it is not a problem that will be settled by campaign oratory, however skillful.

It is the problem of what to do about the small farm—or so-called family-type farm. With the increasing emphasis on Rural Electrification Administration's rural telephone loans, whatever over-all policies may be adopted by the federal government in this field can become quite important.

It is generally known that there has been a constant and tremendous reduction of farm population and of the number of individual farms in recent years. This decline is even more dramatic against a background of dynamically increasing total population and total farm production. In plainer words, we are growing much more stuff for many more millions of people (more than needed in fact), but we are doing it with fewer and fewer farms and working farmers.

The obvious point of interest in all this, for the telephone industry, is the need for constant checking of rural goals and schedules. Whereas the number of farms without a telephone less than a decade ago was in the order of two-thirds of the total number of farms, today it is about one-half. But if the unserved half continues to shrink in the number of potential subscribers, the added impact of both commercial telephone company effort and REA loans, including the steady increase in co-op operations, is going to have the cumulative effect, before many years, in driving down the remaining unserved farm potential. Whether the country goes Republican or Democratic, over the short range or the long range, this declining number of farms seems to be a fairly established trend.

What is behind it? Obviously efficient farming is relentlessly driving out the small farmer and less efficient farmer. Of course, we could slow that process down by handing out federal subsidies for unneeded crops which would tempt the marginal farmer to stay in business (even though most of the subsidy money would find its way into the pockets of larger and more efficient producers). But would this be a good thing, or a smart thing, for the country as a whole, or for the farmers? By way of imperfect analogy, it might have been possible for the federal government to subsidize a lot of automobile manufacturers who used to be in business years ago, but who fell by the wayside in the face of free industrial competition. Would that have been good for the country, for the taxpayer, for the end product of automobile manufacturing?

As a nation we have been rapidly converting our population over the past half century from agricultural to industrial economy. Traditionally we respect the farmer — especially the family-type farmer—as the last outpost of economic independence. He was the man who was able to raise a large family and feed his own offsprings (making liberal use of their labor, of course) by the simple process of living on his own land and raising his own products.

But like so many other fond memories of yesteryear, the family-type farm is losing out in favor of the large-scale efficient farmer (with or without family), who can raise the necessary investment for expensive machinery and who can manage it successfully. In short, the successful farmer today has become a businessman (and a mighty smart one at that).

The alternative to subsidizing farmers to stay on the land from which they would otherwise be eased off, is not a clear one. It would seem to lie in a number of steps that would make his transition less burdensome.

One big obstacle is the refusal of farm children to stay on. Poets and song writers may rave about the harvest moon and the wonderful healthy life down on the farm, but the smart youngsters today are not buying the idea very heavily. The rewards of employment in the cities, not to mention other metropolitan attractions, are too obvious.

Whatever is the family farmer to do? Hired farm help is even in a worse situation. Except for some of the old-timers who prefer the familiar scenes of their earlier lives, most eligible hired help are attracted to city employment equally if not more than the farmers' sons and daughters.

Without either family help or reliable hired help, modestly successful farmers are compelled to curtail their operations. They just cannot handle it alone. Their curtailed operations fail to yield a living. The next step is to find part-time non-farm work for themselves—in the canneries, fisheries, hauling, doing some custom farm work to pay for a piece of essential equipment that will not pay for itself, setting up a filling station or welding shop, taking a part-time job in the semi-rural industrial plants.

The more he examines the rewards

XUM

of this part-time work, the more the erstwhile farmer, himself, is driven to conclude that, for his own good, he had better make it full-time employment. A good field is sliced in two by a new superhighway. There is a chance to sell off an acre or two at residential prices. Presently, he finds that he is left with what amounts to a rural home and no farming operation worth keeping up. In the next census he shows up as one less farmer in the grand total and his farm is likewise erased from the grand total of farm units.

Paradoxically while all this is going on, the price of farm land, under the triple spur of the memory of high wartime earnings, veteran benefits, and the ambition of young married people to get a place of their own, has reached an all-time high in many places. The young people pool their savings and pledge their credit and find out, too late, that the farm home of their dreams is not going to pay out at prevailing prices of farm produce.

Nobody can foretell when this trend will end. Obviously, there must be some minimum number of farm operators to care for the nation's food supply. But that minimum is certainly not in sight. On the contrary, the mounting surpluses and low prices (except where bolstered by government subsidy) go on quietly and steadily, and the farmers continue to slip away from the farms. Some of those who remain protest, others manage to keep going, and quite a few get into the bracket of large-scale successful operations.

What will all this mean to the telephone companies serving rural areas in the future? It is a matter well worth watching.

Toll Ties to "Old Country"

The ceremonial inauguration of the new transatlantic cable between North America and Europe went off in grand style in New York on Sept. 25. Bell System officials talked with their opposite numbers in London and Ottawa, and the 42 million dollar underwater communications span was pronounced a great success by all parties concerned.

Bell System furnished complete background information to the press and others unable to attend the New York ceremonies. The whole affair was given wide publicity, which was well deserved in view of the importance of the project. But there was one angle to this submarine cable launching which has not received much, if any, attention. That is the impact of such greater transatlantic telephone service on the future of the telephone business on the whole in this country and upon the future telephone habits of our telephone-using public.

The Independent telephone industry, for example, can look for an increasing share of transatlantic toll business to the extent that these cables are going to increase the volume of American-Europe long distance calls.

A heavy upsurge of calls to Europe, plus limited frequencies for radio-telephone circuits, made the transatlantic telephone cable a necessity. Last year, calls to Great Britain alone totaled over 100,000—a 20 per cent increase over five years ago.

From the first year of service with the British in 1927, the volume has multiplied almost 50 times. No end to the increase is yet in sight—and it is expected the new cable will be operating at capacity within two or three years. A second transatlantic telephone cable is already being planned.

It would be a mistake, of course, to assume that Independent companies will share in the transatlantic telephone business in direct proportion to the increase in the number of such calls. That is because the great majority of transatlantic telephone calls have been, and probably will continue to be, business calls and not social calls. Business calls naturally originate, in the large extent, in the very large cities New York, Chicago, etc. That means that the lion's share of business calls is likely to be Bell System business.

But with greater volume and better quality transatlantic telephone service becoming available, there is bound to be an eventual pick up in the number of social calls. The experience of the telephone industry has already shown this to be true in the volume of long distance calls in the Continental United States.

It is not too farfetched to expect that, within a few years, a telephone call to relatives in England, France, Germany, Italy and the Scandinavian countries will become as commonplace as traditional New Year's, Christmas, and other family reunion type of calls are today between far distant points within the United States. This is bound to take in more and more Independent telephone company territory.

We can readily imagine the heavy Scandinavian and German population of some of our middle western states calling their relatives in the old country at periodic intervals. What would at first be a novelty, if not a luxury, would soon become a regular form of communications, superseding letter writing for important events of family communications.

This same pattern was worked out and witnessed many years ago in domestic long distance telephone experience. It will not be long before the announcement of marriages, new babies, and traditional feast days and holiday traffic will begin to make a real impact on the transatlantic toll call load, now preoccupied mainly by the business men. This writer, for example, looks forward to swapping a story or two with his old Uncle Tim in Limerick—come next St. Patrick's day—if the old gentleman is willing (and able) to talk at that time.

Independent Union Merger

Obscured by the political fireworks of the presidential campaign, and the activities of the AFL-CIO, is a union-labor development which may well affect a number of utility companies, including some telephone companies. This is a proposed merger of the two largest federations of independent unions — as distinguished from the AFL-CIO unions. Most of these independent unions are representing workers in the oil, chemical, telephone, automotive, television, radio, gas-electric utility, aircraft, truck, tool and die, and meat packing industries.

Of course, a good many independent unions have not affiliated even with the independent federation, of which there are two national groups. And it is these two national groups which are now preparing to merge. But to give some idea of the size, it has been estimated by Don Mahon of Des Moines, executive secretary of the National Independent Union Council, that there are in all about six million to seven million workers represented by independent unions. Of these the National Independent Union Council claims representation for two million members, while the Confederated Unions of America represent nearly 500,000.

Late last month, these two unions met in separate conventions in the Sherman Hotel in Chicago with the expectation of unifying both groups. A proposed constitution for unifying the two associations was duly adopted and the marriage is expected to take place with the ratification of the respective memberships. This would mean a confederation, on a national level, of approximately 2.5 million independent union membership.

When we compare this with approximately 15 million membership claimed by the combined AFL-CIO, it will be readily seen that the independents constitute a considerable segment — roughly about one-sixth, according to respective claims. Of course, there is no independent audit of labor union

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XUM

REA Makes Nine Rural Loans Totaling $1,921,000

Nine Independent telephone companies and cooperative associations obtained $1,921,000 in long-term, low-interest loans from the Rural Electrification Administration the week of Sept. 16, the U. S. Department of Agriculture has announced. This financing will provide dial service for more than 3,700 farm families and other rural subscribers in New Mexico, Idaho, Kansas, Maine, Louisiana, Pennsylvania, Texas and Wisconsin. Details of the loans follow:

E. N. M. R. Telephone Cooperative, Clovis, N. M.: $52,000, fourth loan (Sept. 18).

The borrower will use these funds to finance redesigned toll trunking requirements and to complete the system authorized in prior loans.

The seven automatic exchanges of the cooperative's system are already in operation serving about 600 rural subscribers. The borrower plans a completed system of 922 miles of line to serve 884 subscribers in Curry, Quay and Roosevelt counties.

*

Aberdeen Telephone Co., Aberdeen, Idaho: $145,000, second loan (Sept. 20).

The borrower will expand into the adjacent Springfield community to serve 172 rural families. They include 65 families now without telephones. The company proposes to acquire the subscriber-owned Springfield Telephone Co. now furnishing magneto service to 107 subscribers over 34 miles of line.

The borrower plans to remodel a warehouse building acquired with the Springfield facilities to house new automatic equipment, and add 23 miles of new line. Five miles of the existing line will be used in the expanded system, about 28 miles will be rebuilt, and the remainder retired.

A portion of this loan will be used to complete construction authorized under the first loan to the borrower. The two REA loans, amounting to $299,000, will make possible new and improved service to 795 rural subscribers over 115 miles of line in Bingham County. The borrower anticipates that the Aberdeen automatic exchange will be in operation before the end of the year.

S. F. Monsen is president and manager of the company.

*

The Harper County Rural Telephone Association, Anthony, Kan.: $257,000, second loan (Sept. 20).

The borrower will use these funds to extend service into Grant and Kay Counties in Oklahoma, and to serve additional territory in Sumner County, Kan. As a nucleus for the new service, it proposes to acquire the telephone properties of the Braman (Okla.) Mutual Telephone Co. and access rights to the area served by the Hunnewell (Kan.) Telephone Co. These companies are now furnishing magneto service to 294 subscribers over 103 miles of line.

The Harper County cooperative proposes to construct with REA loan funds a new automatic central office at Braman, and to add 49 miles of new line. The Hunnewell area will be served by the borrower's South Haven exchange. Seventy-nine miles of the existing line will be rebuilt for use in the expanded system. The expansion and new facilities will provide initial service for 104 rural families and improved service for the existing subscribers. In addition, a portion of the loan will be used to complete the first section of the system provided for under a prior loan.

REA loans totaling $620,000 will make possible new and improved service to 1,160 rural subscribers in Harper and Sumner counties in Kansas, and Alfalfa, Grant and Kay counties in Oklahoma. The system will consist of 441 miles of line and automatic exchanges at Corbin, Freeport, South Haven and Waldron in Kansas, and Braman in Oklahoma.

Dean Hughes is president of the cooperative-type association. Manager is E. J. Salter.

*

Hebron's Home Telephone Co., Hebron, Me.: $13,000, fifth loan (Sept. 20). This loan will enable the borrower to provide facilities for 17 additional subscribers not included in prior loans, to install a PBX for a mill and a PABX for Western Maine Sanitarium, and to cover increased costs on construction already underway.

*

This company has received REA loans totaling $172,000 which will make possible new and improved service for 364 rural subscribers over 81 miles of line in Androscoggin and Oxford counties. The new automatic central office at Hebron is already cut over, and the one at North Norway will be completed next year. Alden W. Morgan is president and manager.

*

Lafourche Telephone Company, Larose, La.: $1,073,000, sixth loan (Sept. 21). The Lafourche borrower plans to use these loan funds to furnish initial service to 2,731 rural subscribers in its area. New facilities will include 109 miles of line.

The six loans, totaling $2,454,000, will make possible modern telephone service to 4,722 rural subscribers over 290 miles of line. In addition, 20 mobile radio-telephone stations are planned to serve the Gulf Coast region of the system. The borrower's system consists of six automatic exchanges, all in operation, serving about 2,000 subscribers in Jefferson and Lafourche parishes.

John A. Brady Sr. is president and manager of the company.

*

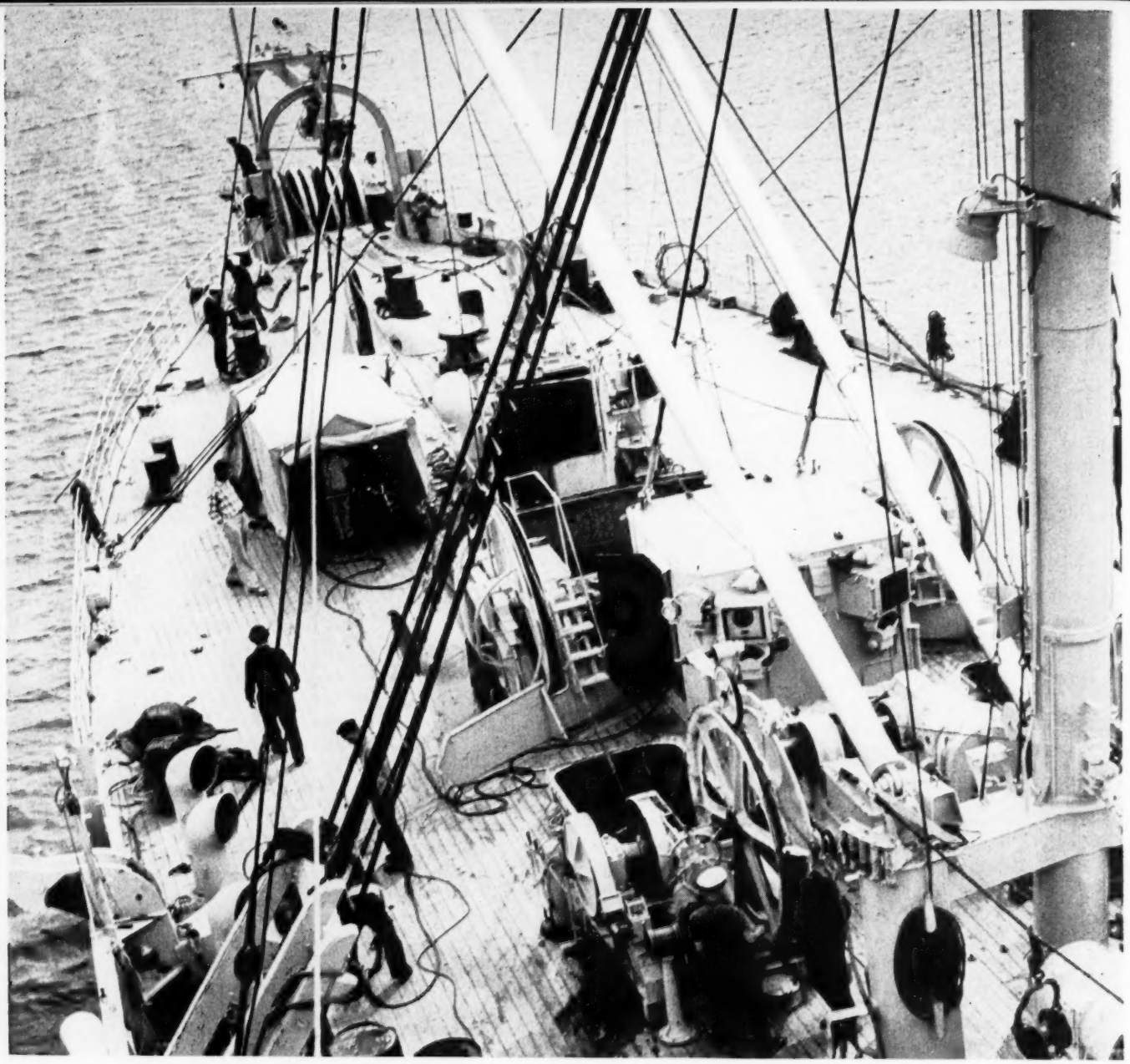
Taylorstown (Pa.) Telephone Co. $162,000, first loan, to finance the extension and improvement of rural telephone service in Washington county (Sept. 21).

The new borrower, a commercial corporation, proposes to use these funds to convert its system to automatic operation and provide initial service for 75 farm families and improved service for 233 existing subscribers. The company now furnishes magneto service over 47 miles of line.

The borrower proposes to construct a new combined automatic central office and headquarters building in Taylorstown, and add 16 miles of new line. Of the present line, 31 miles will be rebuilt, 12 miles will be used in place.

V. M. Paul is president and manager of the Taylorstown company.

(Please turn to page 47)



View of foredeck of Cableship Monarch that laid new transatlantic telephone cables.

Transatlantic Telephone Cable System

A NEW transatlantic telephone cable system—the first physical voice link between North America and Europe—was inaugurated on Sept. 25 and opened to public service.

Cleo F. Craig, newly-elected chairman of the board of directors of American Telephone & Telegraph Co., was the first to speak over the 42 million dollar system. Frederick R. Kappel, who succeeded Mr. Craig as president of AT&T, also participated in the inaugural ceremonies.

In the first call, Mr. Craig exchanged greetings with Dr. Charles Hill, head of the British Postoffice, who spoke from London. Their conversation, carried with the clarity and naturalness of a neighborhood call, highlighted inaugural ceremonies held in New York, Canada and Great Britain.

Mr. Craig also exchanged greetings with George Marler, Canadian minister of transport, in Ottawa.

The cable system, under construction for more than two years, is not only the first of its kind to cross the Atlantic, but the first underwater telephone link to span any ocean. AT&T, the British Postoffice (BPO) and Canadian Overseas Telecommunication Corp. are partners in the historic enterprise.

The deep-sea portion of the system was laid under the supervision of the Long Lines Department of AT&T, the long distance operating unit of the Bell System. Engineers and scientists of Bell Telephone Laboratories designed and tested the system.

A heavy upsurge of calls to Europe, plus limited frequencies for radio-telephone circuits, made the transatlantic telephone cable a necessity. Last year, calls to Great Britain alone totalled over 100,000—a 20 per cent increase over five years ago. From the first year of service with the British in 1927, the volume has multiplied almost 50 times.

No end to the increase is yet in sight—and it's expected the new cable will be operating at capacity within two or three years. A second transatlantic telephone cable is already being planned.

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The transatlantic system can carry 36 conversations at the same time. Thus, it is able to handle about three times the traffic now transmitted between this continent and Great Britain by radio-telephone.

The deep-sea segment of the system extends 2,250 miles from Clarenville, a small village on the east coast of Newfoundland, to Oban, Scotland. From Oban, new trunk lines link the system to switchboards in London.

On this continent, newly-constructed land and water sections bring the transatlantic circuits to Portland, Me., and to Montreal, where they connect to the established American and Canadian networks.

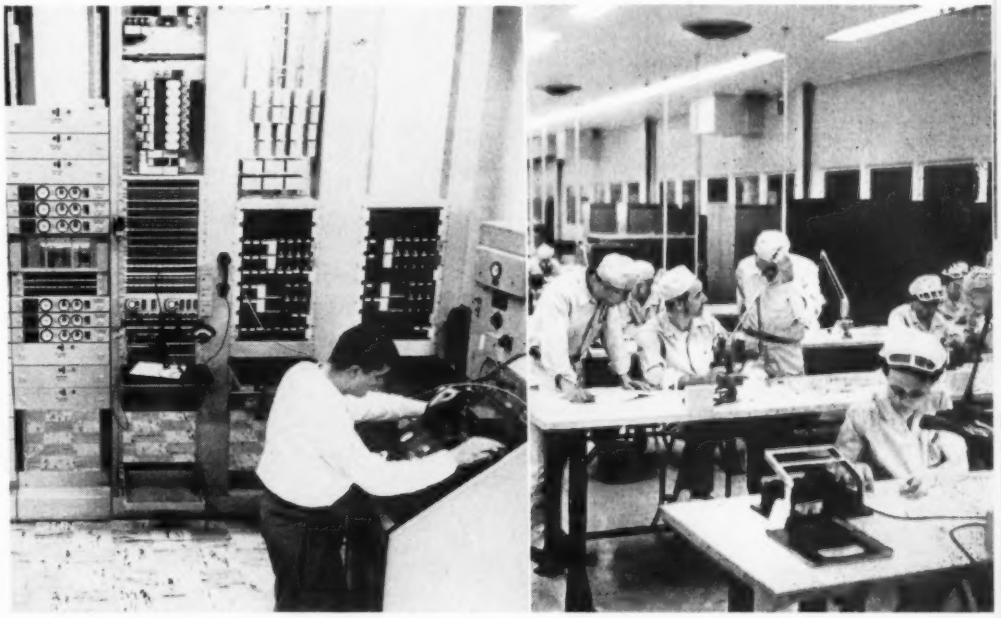
The new undersea telephone cable is like a porpoise in one respect—it leaps from water to air. Length of the leap is 575 miles, from Portland, Me., to Sydney Mines, Nova Scotia. At Portland, the transoceanic system is linked to established domestic circuits, which carry voices to the New York City area, and then to any part of the nation. From Sydney Mines, the transoceanic circuits are carried by shallow water submarine cable to Clarenville, Newfoundland, and from there to Scotland by deep-sea cable.

The Portland-Sydney Mines hop is by 19 radio relay towers, spaced an average of 30 miles apart. Securing right-of-ways for the tower installations, then constructing the facilities, was a task of several years. It was done simultaneously with work on the deep-sea portion of the transoceanic system.

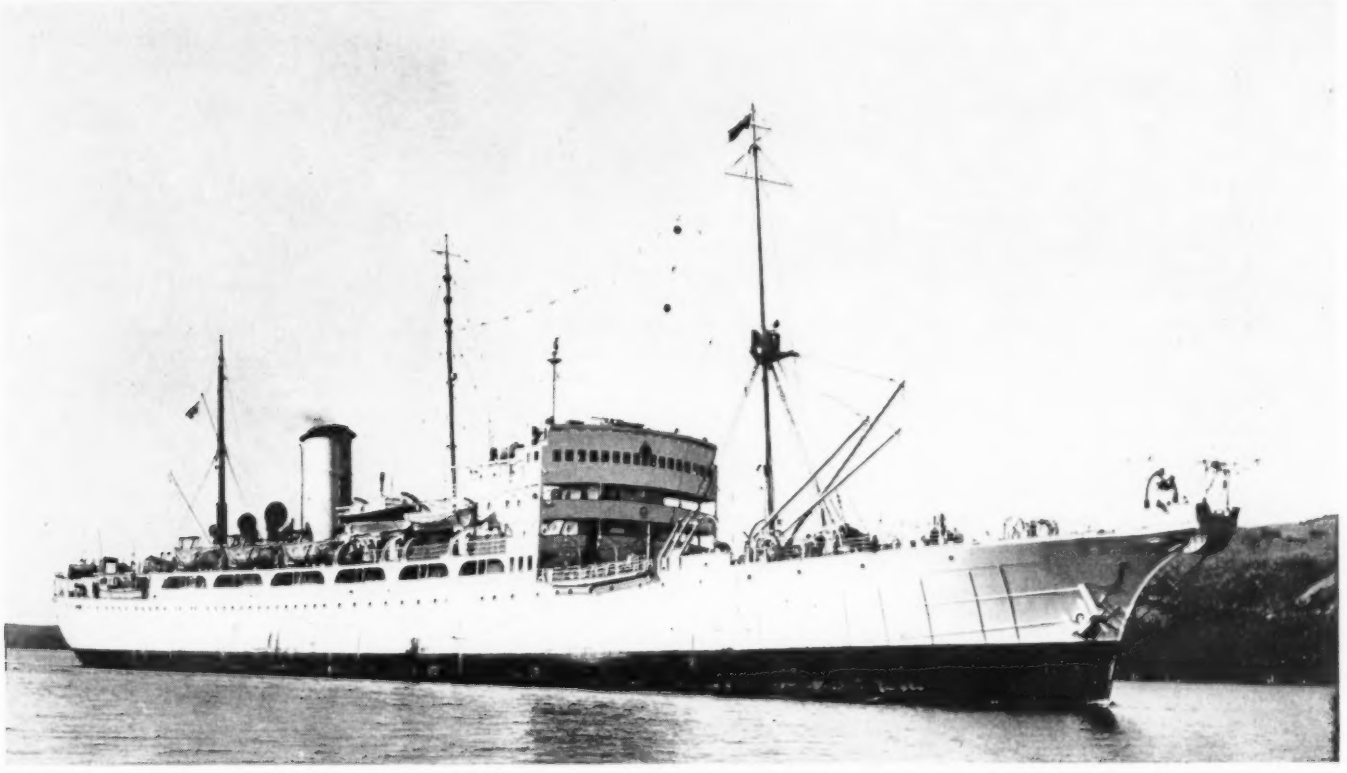
The underwater cables that represent the backbone of the transatlantic system were placed by the cableship Monarch, the largest cable-laying vessel afloat.

The 8,050-ton Monarch took a total of seven months to complete laying operations. She worked only in summer, when the turbulent North Atlantic is on its best behavior. At that, she took a battering from hurricane Ione in September, 1955, but finished her job on schedule.

While laying, Monarch carried as



LEFT PHOTO: Portion of intricate switching, testing and power equipment located inside of transatlantic cable terminal building at Clarenville, Newfoundland. RIGHT PHOTO: Amplifiers for cable were made at Western Electric's plant at Hillside, N. J. Stringent precautions, including hourly dust counts, humidity and temperature control, were taken to eliminate possibility amplifiers could become "contaminated" and fail at bottom of the sea. Workers changed to clean, lint-free clothing whenever entering working area.



The Monarch is the largest cable-laying vessel in the world. During past two summers, despite rain, fog, snow, sleet, and hurricane, she placed more than 4,000 miles of underwater telephone cable in the new 42 million dollar transatlantic system.

XUM

much as 1,300 nautical miles of cable. Her cable laying speed was about six knots.

Since cables of the design used in the Atlantic section of the system transmit in but one direction, two cables were needed to make a conversation possible. The two cables lie some 20 miles apart on the ocean floor; the southernmost transmitting west to east and the northernmost east to west.

The route of the twin telephone cables on the floor of the Atlantic Ocean was carefully plotted in advance— then re-checked many times. Often the depth of the sea was measured by the cableship Monarch as the cable itself was being laid. This was done with a device called a fathometer, which bounced sound waves off the sea bottom. Precise timing of the bounce determined the depth of the ocean.

Care was taken to avoid laying the cable in ocean holes, where the bottom drops off suddenly, as the cable might have kinked. Also, the route from Clarenville to Oban was selected to avoid telegraph cables in the North Atlantic. All of them lie to the south.

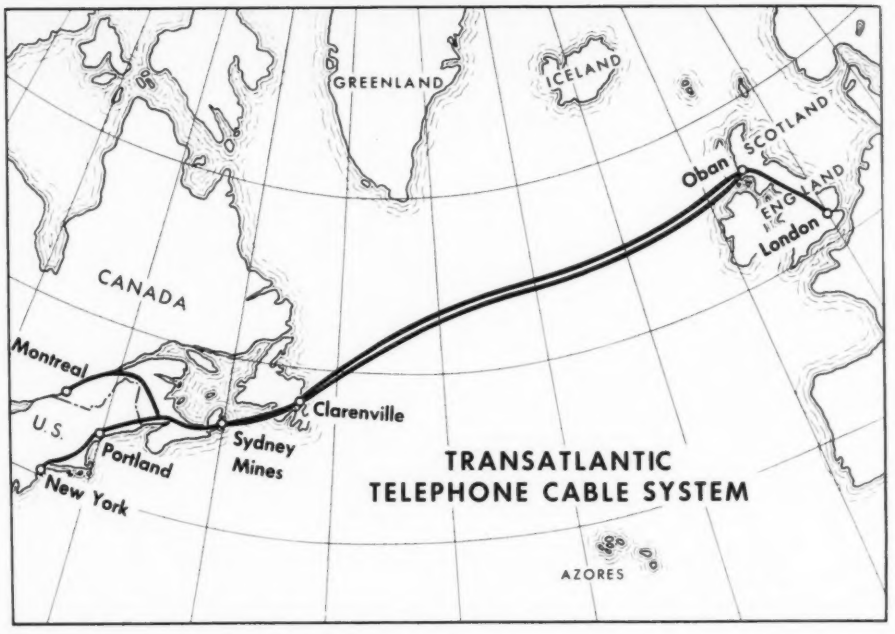
Both cables, which have an average over-all diameter of 1¼ inches, were put down in three segments. In June, 1955, 200 miles of the west to east cable was placed from Clarenville to the edge of the Continental Shelf. A second segment extended this cable to a point 500 miles off Scotland and the third closed the gap. This past summer, the process was reversed.

Some 300 miles of cable was also placed across Cabot Strait in the spring of this year, linking the terminal at Clarenville to the new land-line at Sydney Mines, Nova Scotia.

Part of the transatlantic telephone cable is not in the ocean at all—but instead, is buried across a 64-mile neck of land in Newfoundland. "Land" is hardly the proper term, however, for the route of the cable section which runs from Clarenville to Terrenceville. Much of it consists of "muskeg," which is a type of bog containing moss lying over water. It appears to be solid, but often men sink to their hips when trying to stand on it.

Cable-laying through muskeg, as well as innumerable lakes, ponds, rivers, inlets and bays of Newfoundland, was no easy task. Special trench-making equipment was used, and cable reels were inched along with the help of wooden poles. The cable itself was of submarine instead of land design—the same as the underwater section from Newfoundland to Nova Scotia.

Successful completion of the Atlantic cable system climaxed a quarter of a century of active research in this field



Route of the transatlantic telephone cable system is shown on the above map. It stretches 3,205 miles from Portland, Me., to Oban, Scotland. Various domestic circuits carry the messages to the New York City area, Montreal and London.

by communications men on both sides of the Atlantic.

The particular problem that had to be overcome was development of an underwater amplifier, or repeater. While repeaters are relatively easy to install and maintain along land cable, the undersea cable demanded an amplifier that could:

(1) Be built into the cable in such a way as to be able to pass easily through a ship's laying gear without interruption.

(2) Withstand pressures of at least 6,000 pounds per square inch.

(3) Operate without attention for at least 20 years.

Bell Telephone Laboratories, after years of research, perfected such a repeater, which has been under test for 15 years and in operation in cables stretching from Florida to Cuba since 1951.

The repeaters, about 8 feet long, appear as a slight fattening in the cable and might not be noticed by the unpracticed eye as they slide seaward from the ship's gear. To keep signals constant and clear, 51 repeaters, spaced about 40 miles apart, are located in each of the transatlantic cables.

The repeaters were manufactured by Western Electric Co. at Hillside, N. J., in a building that was once a bus terminal but is now one of the cleanest factories in the world.

Among the components actually built by the Bell Laboratories in Murray Hill, N. J., were 306 electron tubes—three in each repeater—which amplify voice signals.

The tubes had to be flawless in construction and unique in endurance. Assembly of their tiny, carefully inspected parts was done under binocular microscopes. Then an equally painstaking and even more critical phase began—inspection and testing.

Each tube was scrutinized microscopically for mechanical defects, then run through almost interminable tests in an effort to uncover any shortcomings in performance. Before approval, it was operated for 5,000 hours under full voltage—more than the entire life of many ordinary types of tubes. Each tube was studied for symptoms that might foreshadow trouble years later, and it was discarded if even a hint of weakness developed.

Western Electric Co., which manufactured other components and assembled the complete repeater, opened the special plant at Hillside for the single purpose of turning out the 102 repeaters in the transatlantic cable, and for other submarine telephone cables now under construction.

Elaborate precautions were taken at Hillside, as had been taken earlier at Murray Hill, to prevent even a speck of dust from getting inside any part of the repeaters. Humidity and temperature were rigidly controlled. The entire building had both conventional and electrostatic air filtering systems. Personnel wore lint-free uniforms at all times. Rooms where critical work was done were slightly pressurized. Consequently, when doors were opened, escaping air prevented dust-laden air from entering the rooms.

The submarine cable used in the transatlantic system was manufactured

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THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

IN THE August 18 issue, we mentioned on this page a new method of locating opens in cable which was sent us by Dermot K. Foley, of California.

We should have given credit for the development of this method to Ed Meeks, a splicer for the Pacific Telephone & Telegraph Co. in Inglewood, Cal. Mr. Foley reports that Ed is one of the few perfectionists left in this speed age and that when he (Ed) makes a splice it looks exactly like the picture in the book.

We want to congratulate Mr. Meeks for this new method of locating opens for it has certainly stirred up a lot of interesting comment. We have received numerous letters and telephone calls since this item was printed asking for more information on this new and long-desired method of locating the most difficult type of cable trouble, the open conductor.

•

We received recently the following letter from E. W. Ford, district plant superintendent of the California Interstate Telephone Co. at Ridgecrest, Cal., in which he comments on our reference to load control for central offices to be used in case of emergency:

"I would like to point out the fact that the Pacific Telephone & Telegraph Co. did have a line load control system installed in some of its offices in Los Angeles during World War II. It was controlled by one panel and could cut out certain line finder groups in order to restrict all calling to a minimum.

"Hospitals, doctors, and defense groups had outside access at all times.

"I believe, however, that most of this equipment was removed after the war."

•

In a letter we have just received from T. W. E. Towers, sales manager for the Telephone Mfg. Co., Ltd., in London, he refers to an item on this page in the June 16 issue describing a "line-concentrator." Mr. Towers' letter states in part as follows:

"We would like to draw your attention to the T.M.C. Subsidiary System which performs similar functions. This system is designed to provide service for 10 subscribers over 2 two-wire junctions to a parent exchange (no extra control wires are needed).

"It operates on the switched junction principle, the selecting relays being contained in a parent unit fixed at the main exchange and a subsidiary unit located at the remote distribution point.

"Power supply is not required at the subsidiary unit as the selecting relays are operated and released by current pulses transmitted from the parent unit.

"The maximum loop resistance between a subscriber's telephone and the parent unit is in the order of 1,000 ohms for a 50-volt parent exchange."

•

The Michigan Bell Telephone Co. recently completed an underground cable distribution system serving a new 118-home subdivision.

Not only the feeder cables, but also the service cables into the houses are placed underground. Polyethylene-insulated cable was used in this project.

This company has also formed a buried facility committee to iron out problems, suggest designs, secure materials, and develop tools and techniques, for this new type of construction.

During this fall and summer, nearly 4,000 homes and 1,000 trailer lots will be served by this new type of underground service. Nineteen new residential areas, ranging from 47 to 387 homes each, have been selected as trial areas for buried cable service.

A special self-propelled trenching machine has been purchased by Michigan Bell for use on these trial installations. It will dig a trench up to 4½ inches wide and 30 inches deep. When soil conditions are favorable, it will dig a trench at the rate of 12 feet a minute.

The service cables are connected into the main cable at terminal boxes housed in a cylinder-shaped covering that stands about 4 feet above the ground. This post is 7 inches in diameter. The upper part is removable to provide easy access to the terminal points for splicers and installers.

These experimental installations will be watched with considerable interest. There is no doubt that they hold great promise of success, and there is every reason to believe that in the future more and more of our cable distribution plant must be placed underground.

•

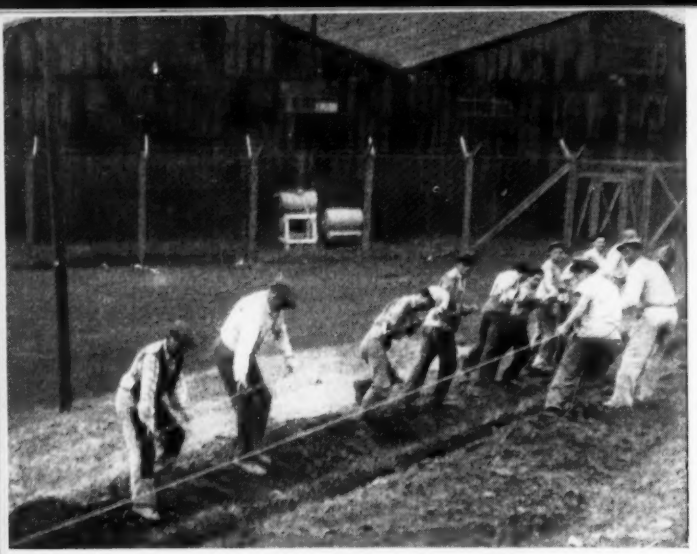
We have a note from Jay Houghtaling, of Minneapolis, telling us how much he enjoyed our story on the trip to Alaska. He also mentions that it brought back pleasant memories as he spent two weeks with Martha and John Cushing in their beautiful home at Sitka, and also at Kodiak.

Six New ABC Articles On Outside Plant

Starting with its Nov. 17 issue TELEPHONY will publish a series of six articles (as a part of the popular series entitled "ABC of the Telephone," by Frank E. Lee) which will provide a comprehensive review of outside plant construction precedure.

First, there will be a discussion of every up-to-date aspect of planning a new line. Later articles will cover selection of poles, wire and cable specifications, anchoring procedures, mechanization of construction, cable lashing methods, cable and wire fastening devices and other related subjects.

These articles, especially prepared for use by smaller telephone companies, will be written in an understandable, easy-to-read style.



Installations in Azores P

On this Azores job, instead of using a lashing machine, the laborers ganged up and hauled away.

"NO QUESTION about it," Henkels & McCoy partner Louis J. McCloskey said recently, "if we had known about all the problems we'd have to face during our installation of a new outside telephone plant for the Lajes Air Force Base in the Azores, we would have never submitted the bid which won us the contract."

Statistically this was quite a job. Henkels & McCoy of Philadelphia had a U. S. Air Force prime contract that was let through the Olmstead Air Force Base at Middletown, Pa. The contract called for a complete outside telephone plant installation. It involved 32 miles of direct burial cable varying in size from 11-pair to 600-pair, 12 miles of aerial cable on 250 poles, 1 mile of ducts and manhole systems with underground cable up to 1500 pair, and a new 5100-pair central office. In money the job exceeded $625,000.

But it is for far more of a reason than cold statistics that this mid-Atlantic installation will be long remembered by all of those at Henkels & McCoy who had anything to do with it.

Many were the problems arising from the locale of the work.

Communication, for example, was a real headache. Not only could there be no quick telephone contact with the home office, but air mail was often delayed because there's only one airstrip on Terceira Island and crosswinds cause flight cancellations. Some desperately needed material could be flown in but most had to come leisurely over by boat and, because there are no docks on the Island, unloading by lighter added to the time. (A lighter is a large boat or barge used for unloading vessels not lying at wharves.)

Terceira Island, like the other eight islands that make up the Azores, has volcanic soil that's extremely rocky. To illustrate what difficulties this rock presented: one manhole required over 300 hours with a 125 c.f. compressor before completion!

The trench for the buried cable had to cross the highest mountain on the island and the terrain throughout was so rugged that the compressors could get in for only 25 per cent of the work —with the rest being hacked out with 20-pound sledges and rock wedges.

Yet, harassing though the problems caused by geography were, by no means did they compare with the man-made ones presented by the Portuguese and Spanish laborers.

As Henkels & McCoy Job Superintendent Andrew L. Lewis Jr. put it, "Language was a barrier and bullfight days caused about 75 per cent absenteeism. But we had enough reasonably competent interpreters and the bulls weren't active so many days.

"The main obstacle was basic and was one we could do little about: *those fellows have little feeling for anything mechanical.* In the U. S. just about any

Left photo: The Lajes Air Force Base on Terceira Island in the Azores where Henkels & McCoy of Philadelphia installed a complete outside telephone plant. Right: Although signs were usually in both English and Portuguese, the Portuguese and Spanish laborers and skilled workmen knew little more than sign-language English, so communication was a problem.

XUM

es Pose Tough Problems

By William E. Sheppard

No trenching machine was available in the Azores, so just shovels, and a stream of workmen, made do.

fellow you put on a job can drive a car or run a powermower or start an outboard motor. Over there they report with bare hands, bare feet and bare of any knowledge of the tools of our trade.

"Sure, we could show them how to use a compressor, but not to understand what a choke does. They'd run the pneumatic tools without oil and wear out bull points without a care.

"Having had no telephone experience, they thought no more of the cable than if it were sand—and so we had to keep a continuous sharp lookout for kinks."

This "kink-lookout" became quite extended and complicated at such times as when there was a string of 100 men, 20 feet apart, carrying 8,000 pounds of 101-19TA cable as much as a mile to the place where it was to be laid.

Before taking the job, Henkels & McCoy had been assured that the skilled labor available to them was skilled in standard telephone practices. The Henkels & McCoy team on the Azores quickly discovered that what is standard in Portugal is not standard in the U. S.

In talking about the different ways that the men there went about the jobs, Superintendent Lewis said, with a wry smile recently:

"It almost seemed that if there was a hard way and an easy way to get something done, they preferred the hard way.

"For example, although we brought over a lashing machine, they'd get a dozen men on the cable and haul away. We had a standard length winch line but they wanted to use a 200-pound rig that needed six guys on the crank. They set 250 poles and never used a boom. For them we might as well have had an ox cart instead of a line truck.

"To get a smooth job, we taught the men to use a lashing machine and, after much insistence, the winch. But we didn't try to swing them over to the boom . . . there was too much else for us to do. And anyhow, they could do it faster their way than ours and they didn't mind getting the creosote on their hands or clothes."

Another striking difference showed up in the climbers their linemen used. Their hooks have a sort of loop with teeth. With this awkward contraption it not only takes about twice as long to climb a pole but when two men go up the same pole, their hooks are quite likely to become tangled.

Supervision on the Azores, as could be expected, differed greatly from that in the United States. American supervisors get to the job first and lay out the work for the day. Over there the foremen arrive last and then talk things over.

But for all the problems and the different ways of going about the work, the end result turned out well—and that's the way the chief project engineer from Middletown Air Material Base felt about it.

"When the men finally got it through their heads what we wanted them to do," Superintendent Lewis reports, "they came through. Many of them are real craftsmen. The poles lined up perfectly. The block cabling was A-No. 1. The installing work was excellent. Their splicing, though slow, was very good indeed and we probably had 50 per cent less cable trouble than could be expected in the States."

The splicing was done by eight crews working around the clock. Spanish splicers were used because the Portuguese use torch joints instead of the Bell System wiped joints. With an American supervisor, Spanish splicers and Portuguese helpers, language often became a frustrating stumbling block.

For this job which lasted six months (and was completed just in time to avoid the worst of the rainy season), Henkels & McCoy supplied all the engineering organization.

Company partners Louis J. McCloskey and J. L. Lehnan supervised the installation from the Philadelphia office and got to the Azores several times before and during the work.

In a unique arrangement, which nevertheless worked faultlessly, both Lewis and Eugene Henderson acted as superintendent on Terceira Island, dividing the work according to their interests. Lewis, for example, handled most of the relations with the Base, which is a joint Portuguese-American operation and has a Portuguese commander as senior officer.

Eugene Henderson's specialty was the equipment — and equipment that ranged from World War II Jeeps to Cushman Scooters required quite some special attention to stay on the move.

Other key Henkels & McCoy men

(Please turn to page 44)

Berets were accepted headgear, and barefoot workmen no novelty. Superintendent Lewis is straddling the trench.

Transmission Testing

The advent of Direct Distance Dialing brings new significance to transmission problems in telephone plant.

By HAROLD B. McKAY

Part 1

DIRECT current measurements have long been the mainstay of telephone testing. Local and toll testboards are traditionally equipped with voltmeters and bridges for testing line conditions. Probably nothing will ever take the place of this kind of testing, but modern transmission requirements suggest the use of instruments which go beyond the direct current limitations.

A telephone line may use direct current for dialing or supervision, but the main function of the line—the transmission of speech — uses alternating current. The final measure of how well a line is maintained is how well it talks up. Speech currents are alternating at different frequencies, and there are many things which can affect the quality of these currents which would not be noticeable in direct current circuits.

Actually, speech over the telephone is more than just the transmission of alternating currents. The quality of the instrument, the amount of room noise, the sidetone present in the set, the transmitter current, the distance from the office, the noise and crosstalk on the line, the efficiency of the cord or switch circuit, and all of the various repeat coils and condensers along the line all affect telephone transmission.

A system of judging transmission quality which does not take all of this into consideration will not be a true measure of telephone performance. However, a great deal can be learned about telephone apparatus and lines by making relatively simple tests with alternating current.

Thousand Cycle Tone

The use of a frequency of 1,000 cycles has become standard in the telephone business for making transmission tests. The decibel (db) system of measurement is standardized at one milliwatt in 600 ohms for zero db. This means that when a db meter is connected across a 600-ohm load, it will read zero if one milliwatt is flowing in the 600 ohms. Previously, other standards have been used, including six milliwatts, and 500-ohm loads.

Regardless of the standard, the meter actually measures the voltage drop across the load, and this principle can be used for testing. If one milliwatt at 600 ohms is used as a standard, the figures can be quoted at "dbm." The "m" means the milliwatt standard. Most meters today are calibrated to work at this standard. Only when connected to 600 ohms is the dbm reading valid. *Table I* shows the relation between the different standards.

The principle of transmission testing, as it will be described here, is that of applying an alternating current to a line at one end; and then measuring it at different points or at the other end. This type of test will show how well the line will transmit alternating current. This, to a degree, is an indication of how well it will transmit speech.

The most common means of testing employs an oscillator which generates 1,000 cycles. It is usually set to deliver one milliwatt into a 600-ohm load. The oscillator may be anything that puts out this frequency with this amount of power. Ordinary simple code practice oscillators, as shown in radio handbooks, could do in a pinch. However, a telephone company usually requires accurate readings because of the costs involved when mistakes are made. The weakness in any oscillator, whatever its purpose, is that it may be unstable. That is, the frequency may drift, the output power may change, or harmonics may be generated.

Hence, while a 1,000-cycle oscillator may be built out of one or two tubes or transistors, a high degree of perfection is required in the circuit design.

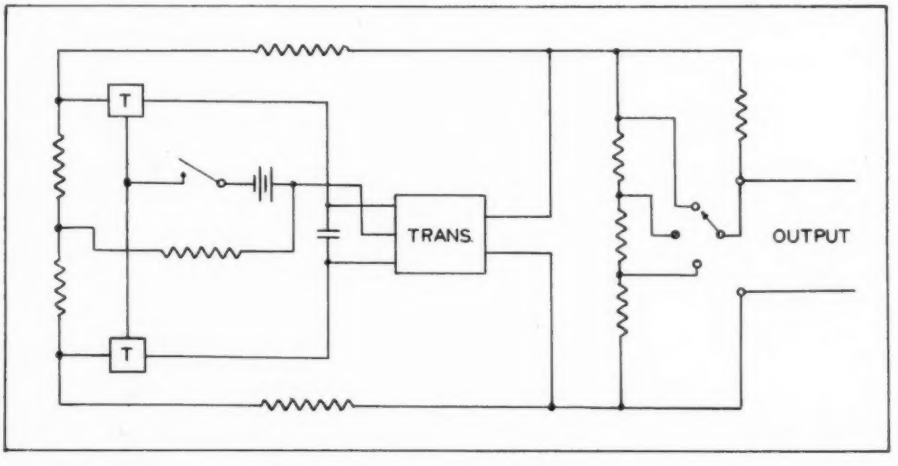


Fig. 1.1. This is a simplified schematic of a 1,000-cycle tone oscillator used for transmission testing. Two transistors (T) in a push-pull circuit eliminate second harmonics. A transformer couples the output to a resistance network. A switch on this network permits selection of 0 db, —16 db and —13 db levels at the output.—From a Stewart Bros. drawing. (All drawings in this series are by Victor Willard.)

XUM

For instance, as soon as the oscillator is connected to the telephone line, this line becomes part of the oscillator circuit. This may cause the frequency to change or it may pull the voltage down. If the length of the line is changed by opening or shorting it while making tests, the output of the oscillator might change, and any meter readings made would be quite unreliable.

A number of manufactured 1,000-cycle tone sources are available for telephone use. These range from things like the motor driven ac generator, used in large offices, to tiny transistor oscillators. A simplified schematic drawing of such a transistor oscillator is shown in *Fig. 1.1.* This uses two transistors in a push-pull circuit. The push-pull feature eliminates second harmonics. It supplies an output at one milliwatt, zero db. It also can supply —13db or —16db by the turning of an output switch which adds resistance to the circuit. These two latter values are used in some carrier and four wire circuits.

Variable frequency oscillators, such as are used with carrier systems testing, may also be used for 1,000-cycle tone sources if they meet the stability requirements.

Testing Method

In use, a line may be tested by first connecting the oscillator to one end, such as the central office. Large companies often connect the tone oscillator to a telephone number so that it may be called from anywhere in the system. The nationwide toll dialing offices have 1,000 cycles at one milliwatt connected to code 102. Anyone with access to the trunks into one of these offices can dial code 102, put a db meter on the line, and determine the loss between his office and the toll office.

What ever the means used, when the oscillator is connected to the line, ac at 1,000 cycles is being sent out on the line. Now, if an ac meter is connected across the line, it will give a reading which will become less as you go away from the office. For one thing, this is because of the voltage drop over the wire, the same as with dc measurements. The important thing, however, is that voltage drop is also affected by the capacity between the wires and the inductances as well as the resistance of any repeat coils, relays or load coils which may be in the circuit. It will also be affected by the balance between the two wires of the pair.

The transpositions of a wire line, or the twist of a cable pair, will cause the magnetism of each wire to interlock with the magnetism of its mate. In a sense, a pair of wires is like a long continuous transformer with two windings wound on the same core.

Split Pair

Now, if anything is wrong with the transposing or twisting of the pair, its ability to transmit ac will be affected. For instance, with cable, if a pair is split over a section, that is, if between two splices, the tip of one pair is spliced to the tip of another, a loss will occur. This is because part of the electrical energy on the pair that we are testing will be transferred in the split section to some other pair. This

(Please turn to page 30)

Data on DB Levels

Power Level DB	Volts—based on 6 MW at 0 db in 500 Ohms	in 600 Ohms	1 MW in 600 Ohms
—10	0.548	0.600	0.245
— 9	0.614	0.673	0.275
— 8	0.689	0.755	0.308
— 7	0.774	0.847	0.346
— 6	0.868	0.951	0.388
— 5	0.974	1.067	0.436
— 4	1.093	1.197	0.489
— 3	1.226	1.343	0.548
— 2	1.376	1.507	0.615
— 1	1.544	1.691	0.690
0	1.732	1.897	0.775
+ 1	1.943	2.129	0.869
+ 2	2.180	2.389	0.975
+ 3	2.447	2.680	1.094
+ 4	2.745	3.007	1.228
+ 5	3.080	3.374	1.377
+ 6	3.456	3.787	1.545
+ 7	3.878	4.248	1.734
+ 8	4.351	4.766	1.946
+ 9	4.882	5.347	2.183
+10	5.477	6.000	2.449
+11	6.145	6.732	2.748
+12	6.895	7.554	3.084
+13	7.737	8.475	3.460
+14	8.681	9.509	3.882
+15	9.740	10.67	4.356
+16	10.93	11.97	4.887
+17	12.26	13.43	5.484
+18	13.76	15.07	6.153
+19	15.44	16.91	6.904
+20	17.32	18.97	7.746
+21	19.43	21.29	8.691
+22	21.80	23.89	9.752
+23	24.47	26.80	10.94
+24	27.45	30.07	12.28
+25	30.80	33.74	13.77
+26	34.56	37.87	15.45
+27	38.78	42.48	17.34
+28	43.51	47.66	19.46
+29	48.82	53.48	21.83
+30	54.77	60.00	24.49
+31	61.45	67.32	27.48
+32	68.95	75.54	30.84
+33	77.37	84.75	34.60
+34	86.81	95.09	38.82
+35	97.40	106.70	43.56
+36	109.3	119.7	48.87
+37	122.6	134.3	54.84
+38	137.6	150.7	61.53
+39	154.4	169.1	69.04
+40	173.2	189.7	77.46
+41	194.3	212.9	86.91
+42	218.0	238.9	97.51
+43	244.7	268.0	109.4
+44	274.5	300.7	122.8
+45	308.0	337.4	137.7
+46	345.6	378.7	154.6
+47	387.8	424.8	173.4
+48	435.1	476.6	194.6
+49	488.2	534.7	218.3
+50	547.7	600.0	245.0

Table I. This handy table shows what a decibel is when measured by different standards. A db meter actually measures volts ac although a voltage scale may not appear on the meter. What a given voltage means when expressed in decibels depends on whether one milliwatt or six milliwatts, or 500 ohms or 600 ohms is taken as the standard, as shown in this table.—Courtesy, Weston Electrical Instrument Corp.

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$how 'em how to $ave

...and you'll sell P-A-B-X

"Look at it from the customer's point-of-view!"
So said a telephone man friend of ours—a man very successful in selling P-A-B-X, by the way. His formula: "Go out, look over a customer's plant, study the customer's operations, and see where P-A-B-X phones could make savings in steps, time, and money. Then make your proposal to the customer *in terms of these savings.*"

As you can readily imagine, our friend usually makes the sale. Which nets him a fine piece of extra revenue —month after month after month.

Why not do likewise?

To help you, we'll gladly send you a big assortment of proven successful promotional material. Write for it today. And remember: we make a complete line of modern P-A-B-X equipment, including stock boards on which you get fast delivery. Address: *Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7. Or call HAymarket 1-4300.*

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electricity which is thus transferred will not reach the ac meter on the pair being tested. Therefore, the reading will be less than if the pair were spliced properly.

If the meter used is calibrated for db and a standard reference level is used, readings may be taken directly in db, and the difference in readings may be quoted as the line loss in db.

In making tests, it is important that the line be terminated. That is, it should be in the talking condition. That is why large companies connect the oscillator to a directory number so that a normal connection may be set up to it. Such a connection tests not only the line but the switching equipment in the office as well.

Fig. 1.2 (upper) shows a method of making tests along a subscriber line. Note that the line can be terminated by opening it at any point and connecting it to a 600-ohm meter. A 600-ohm meter should always be used as a termination. That is, it should always be at the end of the line. If the line goes beyond, then it should be opened at the point where the meter is used. If this is not done, the ac losses on the line beyond the meter will lower the reading. If a receiver was off the hook, this, plus the meter winding, would mean that two terminations were on the line, and the reading would be worthless.

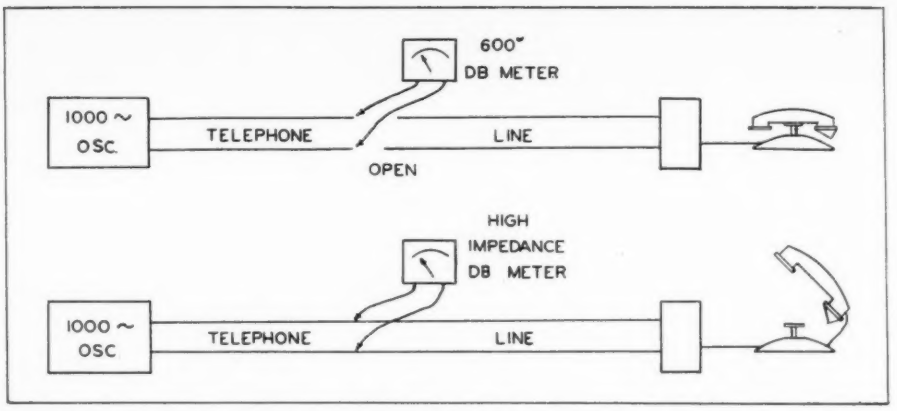

Fig. 1.2. When a 600-ohm meter is used to test the line, the line should be opened at the point where the meter is used. When a high impedance meter is used, it should be bridged across the line. The line should then be terminated in the normal manner, such as with the receiver off of the hook.

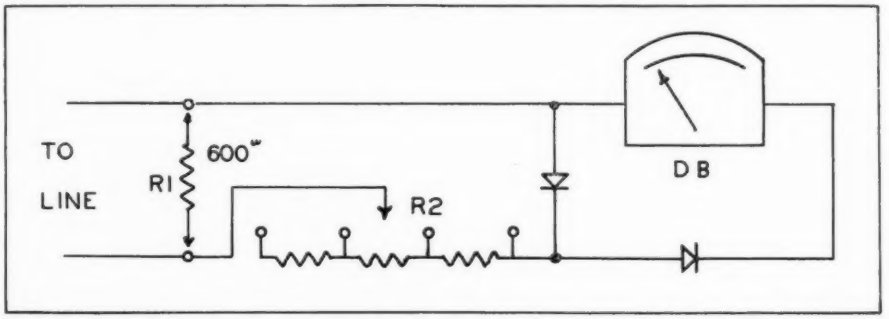

Fig. 1.3. A decibel meter may be a dc voltmeter with crystal rectifiers to enable it to measure ac. Different ranges are obtained by a switch which cuts resistors in or out of the circuit. Most multimeters are built on this principle, but instruments especially suited for telephone use have the added resistor R1 which is put in the circuit by turning a switch, when terminated db readings are wanted.—From a Weston Electrical Instrument Corp. drawing.

Bridging Tests

If it is desired to make readings without opening the line, then "bridging" tests can be made. This is shown in *Fig. 1.2* (lower). Here the line is terminated naturally, such as with a receiver off the hook, or plugged out on a distant switchboard, or a 600-ohm resistance placed across the end. The meter used is high impedance—5,000 ohms or more. Good volt-ohm-milliameters or vacuum tube voltmeters can be used if they respond to 1,000 cycles. Special meters for telephone use may be obtained. These meters may have either a transformer or a resistance in them to change from low to high impedance when a switch is turned. (See *Fig. 1.3.*)

Like most other test equipment, the value in the tests described above rests largely on the interpretation of results. To know that a line shows a loss of 10 db at the end does not mean anything unless you know whether this is good or bad. Where more than one circuit exists, the old telephone standby of comparing your circuit with adjacent circuits can not be beat. This is true where the facilities on the good and bad line are supposed to be identical.

Some companies make tests on all new plant when it is first installed in order to get accurate dbm readings for comparison later when trouble occurs. If plant is installed correctly, the correct line loss should agree with the engineered value. That is, when new plant is installed, the amount of loss to be expected is known before hand. The engineer knows how much can be

A compact tone source is offered in this transistor oscillator. It contained two transistors in a push-pull circuit. It is very accurate and its stability is not affected by the line when it is connected up for use.—Photo, courtesy Stewart Bros.

This volt-ohm-milliameter, also called an analyzer has a decibel scale and a built-in 600-ohm resistor. This enables the instrument to be used either as a bridging or terminating db test meter. —Photo, courtesy Weston Electrical Instrument Corp.

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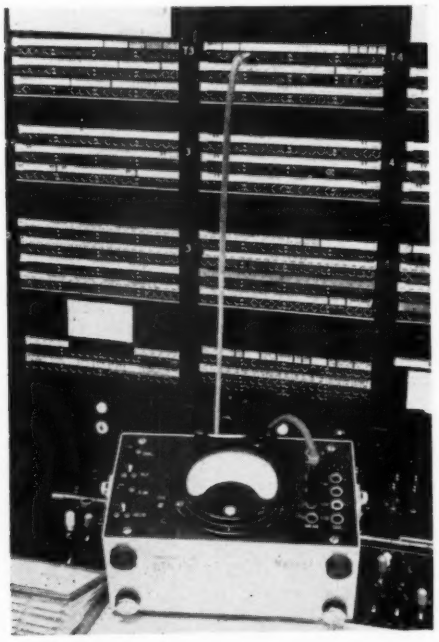
tolerated, what the company can afford, what future extensions can be expected, etc. From this he selects the size wire or cable, the loading, etc., and from this he knows what the loss should be. If the measured loss is different from the calculated loss, trouble is indicated.

Wire Tables

Wire tables can be procured from the wire manufacturers or distributors which give the loss which may be expected on different types of lines.

In addition to trouble locating on the wire lines outside the office, the transmission test method will also reveal defects in the office equipment. The windings of repeat coils or relays which connect to the voice path of the line



Transmission testing can be made directly at a switchboard when 1,000-cycle tone is wired into the multiple. Here a db meter is being checked against the tone supply.

can have a few turns get shorted out. This may make an unreadably small amount of difference in the resistance of the winding, but may cut transmission down considerably.

Some companies make a regular routine of putting all switchboard cord circuits through a 1,000-cycle test on a regular basis just to turn up troubles like this. Automatic switching equipment is also tested by placing the 1,000-cycle tone on a test terminal and then directing each switch to that terminal.

The blueprints for some telephone equipment have transmission charts included on them. These show how much loss is to be expected in each coil or condenser or relay in the circuit.

Ringing bridges, whether at subsets or in switchboards, can develop a kind of trouble that these tests may show

A 1,000-cycle tone oscillator is contained in this transmission test set. It also carries a decibel meter. It may be used to send tone, which would be measured with a similar instrument at the other end of the line. It can also be used on loop tests, where the tone would be sent on one trunk and looped back and read on another with the single instrument. —Photo, courtesy Shalleross Mfg. Co.

up. A ringer, bridged with a condenser across a line, may develop some short circuited turns. Normally, the combination of the condenser and a relay or bell offers a high impedance to voice currents. With a few turns shorted out, the impedance can be lowered. This will not stop the relay or bell from operating, but it may shunt down the voice currents. This would show up at once on a db meter test.

The effect of bridged taps, or of long lengths of drop wire, may be discovered by making tests with a db meter. In the usual practice, the suspected plant is removed and tests made to see if the db level rises. On long lines which show an excessive loss at the far end, opens can be made and terminating tests made at different points until the section where the trouble lies is found.

First of a Series

The advent of Direct Distance Dialing (DDD) has brought a new significance to transmission problems in telephone plant. This is because under automatic switching conditions, a long distance call might go through as many as eight different trunks.

If each trunk happens to be just a little below par, it may mean a connection which the customer can't use. To prevent this, every piece of telephone plant, local and toll, must be brought up to definite transmission standards.

This article, the first of three parts, explains how simple transmission tests can be made in the plant.

Series Test

The db method of testing is quite versatile, and only a few of the applications have been covered here. Among the other methods of testing is one which involves a tone oscillator and a meter in one instrument.

This instrument permits the use of series test. That is, the meter is placed in series with the line, and the different components of the circuit are shorted out manually. As each element is shorted out, the loss from that part is eliminated; and the db level changes. Good and bad circuits can be compared this way, or the readings can be compared to the transmission data sheet furnished with the equipment under test.

The foregoing discussion has involved circuits on which a loss was expected. In fact some db meters do not read higher than zero db, but read to 10 or 20 db below zero. In selecting a meter, this must be borne in mind. It should read low enough to cover the losses on the longest lines on which it is to be used.

Transmission testing can also be very useful on lines on which a gain instead of a loss may be expected to occur. A repeater, for instance, may have its gain measured by sending 1,000-cycle tone of known level into it, and measuring the level as it comes out the other side. Over-all performance of lines containing repeaters can also be checked with this type of test.

The tests and equipment described in this article have been mainly concerned with voice frequencies at levels usually concerned in exchange work. An extension of these same ideas finds an extensive application in carrier or other toll work. Our next article will describe some of the more elaborate instruments used in this kind of work.

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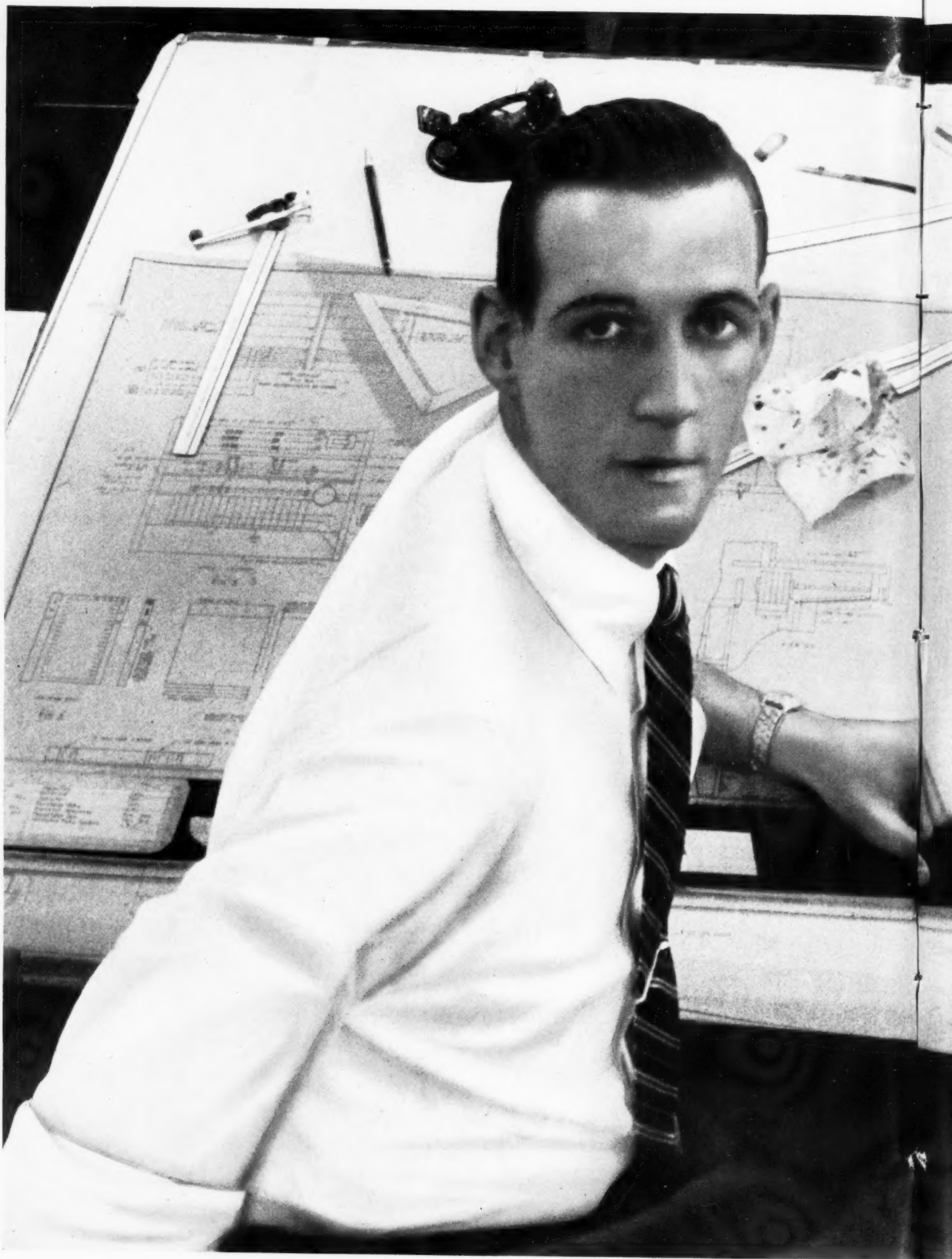

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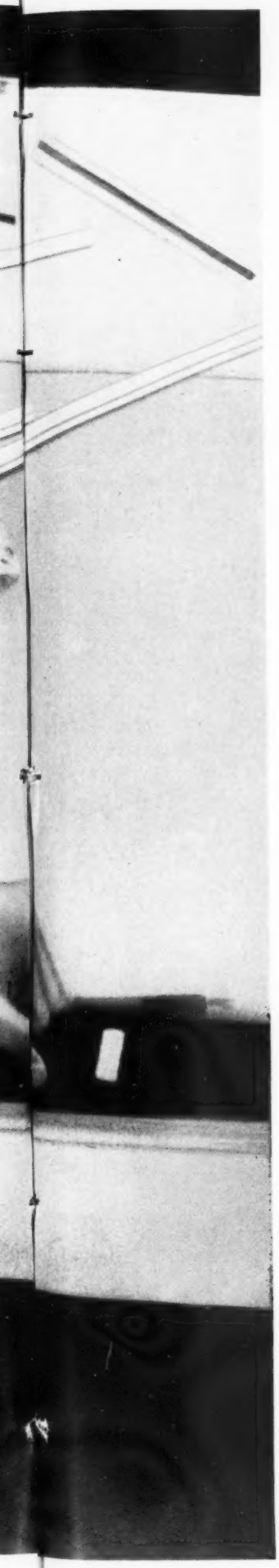

PORTRAIT OF AN INDUSTRY

The Draftsman

With T-square and triangle, the draftsman translates ideas, plans and specifications into drawings that will be followed in producing new and better telephone equipment for Bell telephone companies.

Like the lineman and the operator, the draftsman lends his special skills and talents to help achieve the common goal of the telephone industry . . . providing better telephone service for America.

Western Electric

MANUFACTURING AND SUPPLY UNIT OF THE BELL SYSTEM

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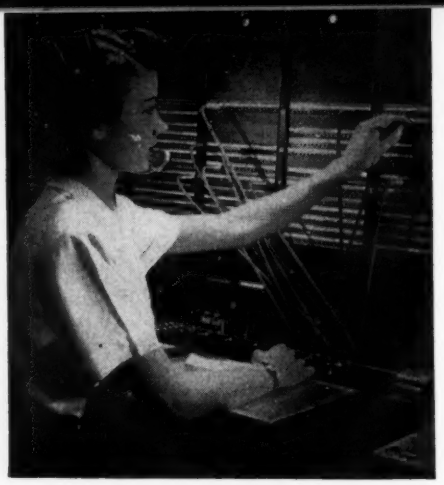

THE Operator's Corner

By MAYME WORKMAN — TRAFFIC EDITOR

DID YOU EVER dream there might be a town in the United States where the telephone would be an innovation? Neither did I. Until just recently, there were no telephones in Ragland, Ala., a small town of 1,500, about 50 miles from Birmingham. Even though the people of Ragland had all the modern conveniences and inventions — television, automatic washing machines, dishwashers and every gadget known to man, they are settling down to enjoy that fantastic invention of almost a century ago—the telephone.

When I started to read this startling news, I could hardly wait to peruse all of it to find out why a community of 1,500 was without telephone service, such an essential part of our American way of life. Here is the story, according to an article which appeared in the Salt Lake City newspaper:

"It was on a Sunday night in this advanced, electronic year of 1956, that the inhabitants of Ragland went to bed with a fluttering excitement. Even for the grown-ups there was that night-before-Christmas feeling, and many an adult awaited the dawn of Monday with suppressed anticipation. At last, the long-awaited day had come when their telephones, installed some six weeks before, were to be turned on.

"Over 25 years ago, during the depression, Ragland's small telephone switchboard, like many other conveniences, had been, of necessity, discontinued, and had never been reinstated.

"The only telephones they had known since were a few in some of the public places, such as the railroad station, drugstore, etc., all on one line, an exasperating inefficient residue of the old independent system.

"Some of the younger people had grown up in the small town without ever having used a telephone. Few, indeed, were familiar with dial telephones.

"Now, modern, colored, dial telephones of beautiful ivory adorn the homes of Ragland, one of, if not the last, town in the United States to acquire telephones.

"All day that bright Monday, the buzzers buzzed, the clickers clicked and the tongues rejoiced. Everybody was happy.

"If the streets of the town that Monday looked a little deserted and the druggist missed the daily visitors about the soft drink tables, it was because many of the housewives were reluctant to leave home. Somebody might call.

"And somebody did. In the first 24 hours, 26,047 calls involving the 250 new telephones were initiated.

"And this was when the children were in school. Many of the pupils found it necessary to go home for lunch that day. One teacher who customarily had 20 or more to buy lunch tickets had only 11 that day. When she commented upon the unusual situation, she was informed that they had all gone home 'to telephone.'

"Not everybody was overjoyed, however. Mayor W. F. Adams, who is also purchasing agent for Ragland's major industry, a cement plant, says he has heard some repairmen threaten to have the 'dad-blasted telephones' taken out after they have been called in the middle of the night to repair breaks in the machinery."

And so you have the story of a most unusual situation — telephone service after 25 years without it. We, who are so accustomed to using the telephone, can hardly realize how the people in Ragland lived without it. It would be interesting to know what they did in times of emergency, fires, accidents, sickness, deaths and births. They must have had some sort of communication method other than the smoke signals used by the Indians many years ago.

In my busy life, I can hardly realize how I could get along without the telephone. It performs many errands, does my shopping, makes appointments, keeps me in touch with friends whom I do not have time to visit. It saves many minutes and hours of time all through the year. Living alone, my bedside telephone gives me a feeling of security and comfort knowing my friends are always close at hand in time of need.

One friend who lives alone, in the category of a shut-in, loves to visit on the telephone. I always call her after I retire so I can visit with her in comfort, propped up in bed, with the receiver resting on my pillow. Occasionally, I doze for a moment but always come to life in time to give the right answers to her questions. To live without a telephone in this day and age, is to live in seclusion, a most uninviting prospect.

We hope the residents of Ragland will enjoy their telephone service for many years to come.

Traffic Questions

(1) When an operator receives a request for the time or charge, or both, if the ticket has been filed but the operator can readily secure it, how should she proceed?

(2) If an operator can not readily secure the ticket and there is a special charge quoting desk in her office when she receives a request for the time or charge, or both, what action should be taken?

(3) When an operator receives a request for the time or charge, or both, if the charge quoting work is combined with Inward or Outward work, what action should be taken by the operator?

(4) When an operator receives a request by a customer as to whether he can dial a specific place, if customers at only certain of the central offices served by your office have direct dialing, how should you proceed?

(5) If an Auxiliary operator receives a request for information as to whether a specific place can be dialed by customers, what action should be taken?

Answers are presented on page 49.

Source of Accidents

"In the horse-and-buggy days, flying trash — especially wind-borne newspapers—was a frequent cause of runaways. Quaint as it sounds, you'd think such accidents were a thing of the past, but they're not. Today trash on the highways kills and maims more people than ever before. The Western Insurance Information Service reports from 750 to 1,000 deaths and nearly 100,000 serious injuries are caused every year by cars striking objects thrown on streets and roads by litterbugs. . . ."—Dallas (Pa.) *Post*.

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Section 22 (Continued)

(14) R (Routine). Show here when a visit is not covered by any of the above code. Do not use the supplementary code "F" with this code.

EXAMPLE: Results of a service review are discussed and a customer's employe is trained for the first time in the operation of the PBX switchboard. The symbol would be OT.

Whenever a telephone call to a PBX customer or attendant will do, it should be made in preference to a visit. Good judgment by the Service Adviser in determining the preference to be used should be based on a knowledge of the nature of the item to be discussed. Telephone contacts can help to plan daily schedules most successfully, in obtaining the best results, in keeping daily activities well balanced and plans so flexible that the most important things to do will be done first.

The Service Adviser should mail supplies, whenever practical.

The proper code must be shown, if the PBX Record Card is to be maintained in good order.

Section 23

PBX Line and Trunk Assignments Prior to Cutover

While you, as a PBX Service Adviser, may never be called upon to do detailed assignment work such as is covered in the three following sections, Sections 23, 24 and 25, on dial line and trunk assignment, it will be worth while for you to know how such work is accomplished.

If you familiarize yourself with the methods described in these three sections you will be able to discuss intelligently with the customer, and other

departments of the telephone company, such problems as concern assignment. You will learn why dial assignments are so important in balancing switch groups and avoiding or correcting conditions that cause service delays and poor service in general.

Should you find the notes a little too technical to easily understand, a short review with the central office dial assignment people will be of benefit.

The manner in which extension lines and trunks are assigned at a PBX has a most important bearing on whether or not the PBX facilities are used as the needs indicate. But, assignment goes even further and assumes an important role in connection with major rearrangements brought about by changes in customer's methods of operating or to care for expansion needs.

The assignment suggestions which follow assume that they will be used as a guide and that efficient use of facilities is the primary motivation. No matter what preachments may dictate, assignments should be made as the customer wishes. Should he wish arrangements not covered by these notes, the information obtained from commercial, the central office assignment forces, or plant, will indicate the assignment pattern.

If arrangements proposed by the subscriber materially affect the efficient use of the PBX facilities, the customer should be so advised. If he still insists his plan be carried out, traffic should be notified in advance of any actual assignment work in order that affected switch groups may be correctly engineered.

Responsibility for the assignment work should be given to someone familiar with the engineering details and the switching arrangements of the PBX in question. Normally the assignment work will come under the supervision of the central office dial assignment force.

(Section 23 to be contiued next week)

TWO BOOKLETS ALL TRAFFIC PEOPLE SHOULD HAVE

"Glossary of Telephone Words and Terms," by Emerson C. Smith, 54 pages; size 4" x 8¾". This is a reprint of a five-installment article published in TELEPHONY. Many traffic terms and words are defined in this booklet making it a ready reference guide. Prices: 1 to 101 copies, $.50 each; 101 to 1,000 copies, $.45 each; 1,001 to 5,000 copies, $.35 each; 5,001 to 10,000 copies, $.30 each; over 10,000 copies, each $.25.

* * *

"Glossary of Telephone Abbreviations," by John A. Bracken, 24 pages; size, 4" x 8¾". This is a reprint of a two-installment article appearing in TELEPHONY. Many of the 1,075 abbreviations are used in traffic, making the booklet a valuable aid for those working in that department. Prices are the same as those quoted above for the *"Glossary of Telephone Words and Terms."*

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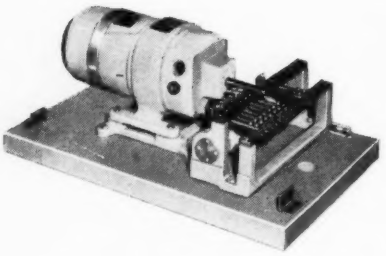

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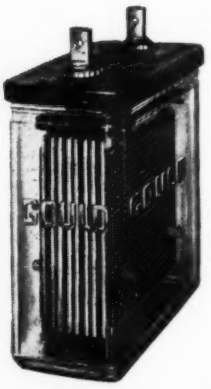

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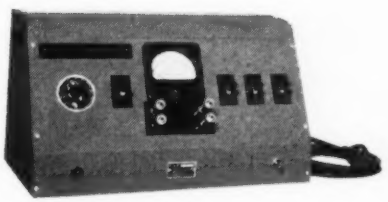

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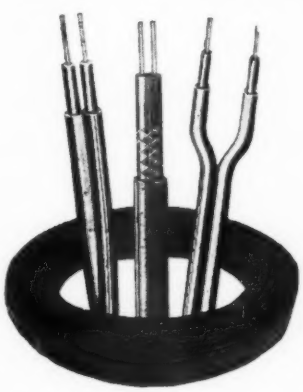

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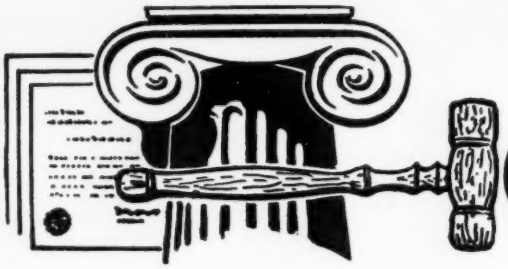

Courts and Commissions

Awaits Arizona Independent Purchase Approval

C. H. Jennings of Fabens, Tex., operator of Independent telephone systems in Texas and New Mexico, is the new owner of Navajo-Apache Telephone Co., Holbrook, Ariz., it was reported on Sept. 5.

Arizona Corporation Commission Chairman William T. Brooks said the commission's approval of the sale, not yet granted, will be a mere formality.

Navajo-Apache was founded in 1906 and was acquired by Lloyd C. Henning of Holbrook in 1912. It was reported the company has been cited frequently in recent years to answer complaints of poor and inadequate service in the communities of Holbrook, Springerville, Show Low, Eagar, Lakeside, Taylor, Snowflake, St. Johns, and Pinetop.

Pennsylvania Commission OKs Sale of Independent

The Pennsylvania Public Utility Commission has authorized the United Telephone Co. of Pennsylvania, Harrisburg, to buy the Hamilton Township Telephone Co., Chambersburg.

The Hamilton company furnishing service to 155 subscribers, had received switching service from United's Chambersburg exchange.

Asks N. C. Commission's Aid in Improving Service

A group of patrons of the Pender County Telephone Co. on Sept. 21 petitioned the North Carolina Utilities Commission to "use its influence and authority" to improve the company's service and equipment, and if necessary to revoke the company's franchise so that they might organize a telephone membership corporation.

The petitioners said the company's service is "unsatisfactory" and charged it with "failure or inability to provide improvement or extension of telephone service." They labeled the service "undependable, outmoded, unsatisfactory, unreliable, exasperating and totally inadequate."

The commission is asked to require the company to provide better service, and install better equipment, or to get the company's property and rights into the hands of someone more capable of providing adequate service.

Appeal Commission Decision On N. C. Co-op Areas

Citing what they claim to be 51 errors in one of the controversial orders of the North Carolina Utilities Commission involving territorial rights between telephone companies and rural telephone membership corporations, telephone co-op leaders in the state on Sept. 17 gave notice of an appeal to the courts in an effort to set aside the decisions (TELEPHONY, Sept. 29, p. 67).

The Randolph Telephone Membership Corp. charged that the commission action in ruling that the co-ops have no exclusive franchise rights under existing law, and that residents in areas set aside for telephone memberships should not have to wait for the memberships to put their systems into operation if they want service by public utilities, was "unlawful," "arbitrary," "capricious," "unreasonable," "unjust," and "unwarranted."

In the particular case in which the Randolph company has appealed, the Central Telephone Co., Charlottesville, Va., was directed to serve people near Asheboro who wanted service from the company without having to wait for the co-op to get organized and into operation.

This ruling and similar ones in two other cases brought considerable protest from certain co-op leaders, who sought to work out some kind of an understanding with the commission. However, the commission said that it thought the questions that had been raised should be settled by the courts and that it welcomed an appeal.

Co-Op leaders contend that the Utilities Commission had no jurisdiction in the matter since it has no jurisdiction over telephone memberships. The Commission agrees that it has no jurisdiction over the co-ops but states that under the law it has a duty to see to it that people wanting telephone service are provided with it as cheaply as possible.

The appeal which has just been filed will be heard in Randolph Superior Court at Asheboro, but undoubtedly will be appealed to the North Carolina Supreme Sourt for a final decision no matter which way the lower court rules, it was reported.

Los Angeles Files Suit For Franchise Fees

A 6-million-dollar lawsuit against the Pacific Telephone & Telegraph Co. was filed on Sept. 12 by the city of Los Angeles. Pacific T&T has been operating in Los Angeles without a franchise since Feb. 8, 1952, and the suit, filed by City Attorney Roger Arnebergh, asks 6 million dollars for use of city streets and other public property by the company since that date (TELEPHONY, May 7, 1955, p. 32).

Arnebergh said he filed the suit to protect the interests of the taxpayers because of a deadlock over how much the company should pay in franchise fees.

The company has offered Los Angeles $250,000 a year, but the city contends that the proper payment should be in excess of $1\frac{1}{2}$ million dollars, which was paid prior to 1952. The city council last year approved a formula calling for payments of 1.7 million dollars yearly, but it was rejected by the company.

It was reported Arnebergh said the franchise would soon be offered for sale at auction.

Behind the rate fight is a California Supreme Court ruling that said franchise fees may be collected on company operations only within the 1905 boundaries of cities that were chartered at that time, and then only on that portion of business conducted on streets and in other public places.

Quash of Deafness Suit Upheld in New York

The New York Supreme Court dismissal last October of the $25,000 suit of Miss Beatrix E. L. Poser, against the Rochester Telephone Corp. over a

"terrific bang" in her ear while operating a private switchboard was upheld by the appellate division, it was reported on Sept. 29 (TELEPHONY, Oct. 29, 1955, p. 35).

The Fourth Department Appellate Division's five justices unanimously affirmed the ruling of Supreme Court Justice Charles B. Brasser, who at the close of the plaintiff's evidence at a jury trial last Oct. 4 granted the defense motion for a nonsuit. That cleared the telephone company of liability. The company was represented by W. Clyde O'Brien of Nixon, Hargrave, Devans & Dey.

Miss Poser claimed that on Jan. 3, 1953, while operating the switchboard as an employe at Eber Brothers & Co. Inc., public market produce firm, a loud bang as from a short circuit in the board resulted in her losing most of the hearing in her left ear.

In granting O'Brien's motion to quash the suit, Justice Brasser found there was no proof of an electrical shock causing the partial deafness or evidence that there was anything wrong with the telephone equipment at the time of the alleged mishap.

Minnesota Commission OKs Five Property Sales

The Minnesota Railroad & Warehouse Commission on Sept. 21 gave authority to the Lime Springs (Iowa) Telephone Co. to purchase all of the Minnesota property of the Cherry Grove Switch Co., whose headquarters are at Lime Springs, Iowa.

The Greenbush Telephone Co. on Sept. 24 was authorized to sell its property to George F. and Dolores M. Wikstrom of Karlstad. The Greenbush company serves about 154 local stations and 141 service stations.

E. R. Thornberg, owner and operator of the Commercial Telephone Co., Belgrade, on Sept. 24 was authorized to sell this property to the Minnesota Central Telephone Co., Hector. The Commercial company serves about 341 local stations and provides switching service for about 93 rural stations.

Also on Sept. 24 the Ace Telephone Co., Houston, was given authority to purchase the Farmers & Merchants Telephone Co., Lanesboro. Farmers & Merchants serves about 381 local stations and switches some 210 rural stations.

Washington County Rural Telephone Co., Cottage Grove, on the same date, received authority to sell to Northwestern Bell Telephone Co., a portion of its rural plant which will be served by the Bell exchanges at St. Paul, Saint Croix Beach and Stillwater.

Minn. Independents Given Raised Rate Schedules

The Minnesota Railroad & Warehouse Commission on Sept. 27 authorized rate increases for the Pioneer Telephone Co. of Wabasha County at its Plainview, Elgin and Millville exchanges.

The approved rates will raise net operating revenues from $81,442 to $90,935 and net operating income from $18,568 to $26,664, increasing the rate of return from 4.68 per cent to 5.96 per cent on a plant the fair value of which would be raised from $396,408 to $447,045 after conversion to automatic at the Elgin exchange, a new building and automatic central office equipment at Millville, and other improvements at all exchanges. Rates as authorized are:

	Old Gross Rates		
	Plainview	*Elgin*	*Millville*
One-party business.	$7.25	$6.00	$6.00
Two-party business.	6.25	5.50	5.50
Rural business	4.75	4.50	4.50
Combined business and residence ...	10.50		
One-party residence	4.25	3.60	3.85
Two-party residence	—	—	3.25
Four-party residence	3.25	2.75	2.75
Rural ten-party residence	4.25	—	—
Rural twelve-party residence	—	4.00	4.00
Rural multi-party residence	—	3.50	3.75

	New Gross Rates		
	Plainview	*Elgin*	*Millville*
One-party business.	$7.55	$7.55	$7.55
Two-party business.	6.55	6.55	6.55
Rural business	5.75	5.75	5.75
Combined business and residence ...	11.10	11.10	11.10
One-party residence	4.55	4.55	4.55
Two-party residence	4.05	4.05	4.05
Four-party residence	3.35	3.35	3.35
Rural ten-party residence	4.45	4.45	4.45
Rural twelve-party (Mag.-St. Charles)	—	4.25	—
Rural multi-party (Mag.-St. Charles)	—	3.85	—

Pioneer of Wabasha serves 771 local, 675 rural and 17 service stations.

On Sept. 24, the commission also approved a raised rate schedule for the Pioneer Telephone Co. of Swift County for its Benson, South Benson and DeGraff exchanges, serving 1,407 local and 400 rural stations.

The new rates will raise net operating revenues from $93,738 to $101,077 and net operating income from $28,358 to $29,452, increasing the rate of return to 5.99 per cent on a plant the fair value of which would be $491,362. Gross rates as approved are:

	Old	*New*
One-party business	$6.75	$7.65
One-party business— DeGraff	6.75	7.40
Two-party business	5.75	6.65
Two-party business— DeGraff	5.75	6.40
Rural business	4.50	5.00
One-party residence	4.25	4.65
One-party residence— DeGraff	4.25	4.45
Two-party residence	3.75	4.15
Four-party residence	3.00	3.25
Four-party residence— DeGraff	3.00	3.15
Rural residence	4.00	4.25

A discount of 25 cents is to be allowed if total bill is paid on or before 15 days from date of bill.

Virginia Commission Oks Raised Rate Schedule

Increased rates were authorized on Sept. 8 for customers of the Norfolk & Carolina Telephone & Telegraph Co. of Virginia, which serves Great Bridge and Princess Anne County.

The upward revisions were approved by the Virginia Corporation Commission, effective Sept. 21.

The revised rates are designed to yield Norfolk & Carolina an additional $33,000 a year in gross revenue. The company contended its present return rate of 4.17 per cent is already low and faced the prospect of a further decline because of a construction program.

The commission normally permits a rate of return of approximately 6 per cent.

Under the new rate schedule, residence one-party charges will increase from $4.00 to $6.75; two-party, $3.25 to $5.50; four-party rural, $3.00 to $4.50, and 10-party rural, $3.00 to $4.25.

One-party business rates will increase from $8.50 to $15.50; two-party, $6.25 to $12; rural four-party, $6.00 to $9.00; and 10-party, $5.00 to $7.00.

In some instances there will be slight reductions in mileage charges.

Colorado Independent Asks Increase in Rate Schedule

The Colorado Public Utilities Commission on Sept. 20 was to hear the application of the Eastern Slope Rural Telephone Association to increase rates for the Genoa and Arriba exchanges.

The proposed rates of the Eastern Slope Company are: Residence, one-party, $5.25; two-party, $4.50, and four-party, $4.00. Proposed business rates are: $9.25 for one-party, $8.25 for two-party, and $7.00 for four-party service.

Mo. Company Seeks Loan

On Sept. 14 the Missouri Public Service Commission received the application of Granby Telephone Co. for authority to issue its mortgage notes in the sum of $66,000 to General Dynamics Corp., through its Stromberg-Carlson division.

construction and maintenance DIGEST

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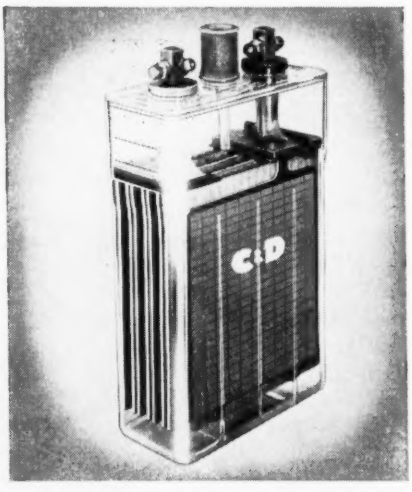
A quarter of a century is the expectancy of an extra-life battery made by C & D Batteries, Inc. In full-float service, their PlastiCal (lead calcium grids) battery will serve your power needs faithfully —often well beyond its 25-year expectancy.



It'll be 1979 before you even have to *think* about replacing this extra-life C & D battery, if you install it now!

C & D Batteries' PlastiCell (high tensile, special alloy grids) battery offers reliable power supply at lower cost, with a life expectancy of 14 years.

How to stretch out the useful life of your batteries

Keep your batteries charged at just the right level, and they'll give you added years of service.

You can maintain the right charge automatically, with the new Raytheon "high-rate" RectiChargeRs .

This constant potential battery charger, like all Raytheon RectiChargeRs, operates 100% automatically. It has special dry disc rectifiers plus an exclusive Raytheon Magnetic Amplifier Control Circuit which maintains precise DC voltage output at any load in the presence of wide changes in AC input voltage . . . increases battery life by eliminating over- and under-charging.

It handles inexpensively all normal power requirements and allows the battery to "stand by" fully charged to meet all emergency demands. You get noiseless current at constant voltage by simple connections to a power outlet and your battery.

Direct burial cables save cost of underground ducts

Ansonia manufactures cables for direct, ductless burial, thoroughly armored to provide the mechanical protection you need for dependable telephone service.

Ankoseal Type 775-AP Direct Burial Cables offer you the added protection of two .013" aluminum alloy flat armor tapes, plus an overall jacket of Ankoseal plasticized PVC over the standard Type 775-P

Layers of protection make Ankoseal Direct Burial Cable ideal for low-cost underground placement of outside cable plant.

Cable. The armor tapes give additional shielding.

With its flexibility and light weight, Ankoseal Direct Burial Cable permits quick placement in trenches or by means of cable plows with small crews.

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Cross-ring in a harmonic ringing system can only be prevented when you find some way to nail down each of the five frequencies—16-2/3, 25, 33-1/3, 50 and 66-2/3 cycles.

If you have looked into this problem, you'll be pleased to know that there is a machine that actually does just that—pins down each frequency and **locks** it by a definite ratio to the 60-cycle input frequency.

This machine is the Lorain H-5 Sub-Cycle. It uses a special principle of operation, making it **impossible** for your ringing frequencies to creep out of line.

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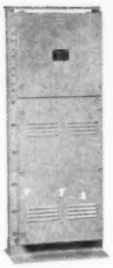
Add to this the fact that the H-5 Sub-Cycle provides exceptional voltage regulation—preventing ringing troubles—and you have a very useful machine indeed.



Lorain H-5 Sub-Cycle.

It's economical to operate, too—the H-5 Sub-Cycle has no moving parts, no expendable components. You just install it and forget it. And it requires only 1400 watts power at full load—slightly more than the full load requirement of a 1 H.P. induction motor.

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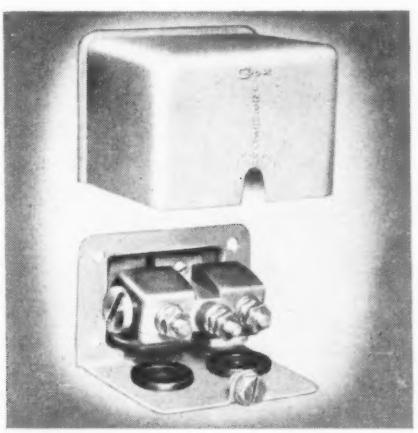
Lower Maintenance Costs—Sounds good, and it is! It's the new "Interceptor," a fuseless sub-station protector made by Cook Electric Company.

The "Interceptor" contains a Bakelite unit having heavy Everdur bussed circuits and ground studs, insert-moulded. It is compact and employs the protection characteristics of the Mini-Gap carbon-to-carbon arrester. There are two



"Interceptor" fuseless sub-station protector

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N. C. Suit Charges Operator Listened In On Line

Because a switchboard operator allegedly divulged to other persons the "intimate personal messages" exchanged by a Fuquay Springs, N. C., girl in a telephone conversation with a relative, the operator and the telephone company have been named defendants in a $15,000 suit.

The suit was filed in Wake Superior Court on Sept. 7 for Joyce Allen, 18, by a friend, Mrs. Irene Jones. Listed as defendants are Mrs. Pauline Newton and the United Telephone Co. of the Carolinas, Southern Pines, which owns the Fuquay Springs exchange.

N. C. Company Secures OK On $1,550,000 Bond Sale

Central Telephone Co. applied to the North Carolina Utilities Commission on Sept. 21 for authority to sell $1,550,000 worth of first mortgage and collateral lien sinking fund bonds. The application was approved on Sept. 26.

The bonds will have an interest rate of 4.5 per cent, will be dated Oct. 1, 1956 and will mature Oct. 1, 1981. Purchasers were listed as Equitable Life Assurance Society of the U. S., New York; Massachusetts Mutual Life Insurance Co., Springfield, Mass.; Wilmington Savings Fund Society, Wilmington, Del.; and Bankers Life Insurance Co. of Nebraska, Lincoln.

N. C. Independent Secures Incorporation Certificate

Service Telephone Co., Fair Bluff, N. C., an operating company, has obtained a certificate of incorporation from the North Carolina secretary of state, it was reported on Sept. 21.

Service Telephone has authorized capital stock of $300,000, of which $2,600 has been subscribed by the incorporators.

Tenn. Commission Grants Revised Rate Schedule

The Tennessee Public Service Commission on Sept. 26 granted the Millington Telephone Co.'s request for a rate increase for the Millington and Munford-Atoka exchanges.

New rates for the Millington exchange are now in effect and those for Munford-Atoka become effective when that exchange is cut over to automatic. In hearings before the commission, company representatives said the conversion to automatic would be made by Oct. 1.

The only service affected in the Millington exchange is two-party residence, which goes up from $4.35 to $4.50, and four-party and eight-party residence rates, which go up from $3.50 to $3.85.

Dial service schedules for Munford-Atoka follow:

Business service: One-party, $3.75 to $7.50; two-party, $3.25 to $6.00; four-party (not available under the present system) $5.00; multi-party, $3.25 to $4.25.

Residence service: One-party, $2.75 to $5.25; two-party, $2.25 to $4.50; four-party (not available now) $3.85; multi-party $2.00 to $3.85.

Asks to Issue Bonds

San Joaquin Telephone Co., Manteca, asked the California Public Utilities Commission for permission to sell $500,000 of 6 per cent income debentures, due June 1, 1974. The bonds are the remainder of a 1-million dollar issue previously authorized.

IN THE NATION'S CAPITAL

Concluded from page 18

membership claims. And newspaper editors and others have long since grown a little skeptical about the actual dues-paying status of some of the brethren claimed for membership. But if we offset one group claim against the other, there are still a lot of union people represented here.

One might ask what is the idea of independent unions associating in a national federation? Offhand it might seem like a contradiction of terms. The avowed purpose of the Chicago meeting was to protect the independent unions from raids by the AFL-CIO unions. Executive Secretary Mahon explained that the federations do not charter unions and do not have a tight control over them as does the AFL-CIO. But the main tie seems to be one of protecting the independent status. Mahon also explained that the federation is not looking for any business from those unions which were kicked out of the AFL-CIO for communist or racketeering activities.

One other action taken at the independent union meeting in Chicago was the refusal to endorse presidential or other political candidates. There was some outspoken criticism of AFL-CIO officials who did engage in such political endorsements. Mahon said: "We do not think such endorsement is proper. I am sure endorsing a candidate will not sway the vote of a union member. We inform our membership of the voting records of candidates and leave it up to the members as to how they should vote. A labor leader attempting to influence the votes of union members is not doing the right thing."

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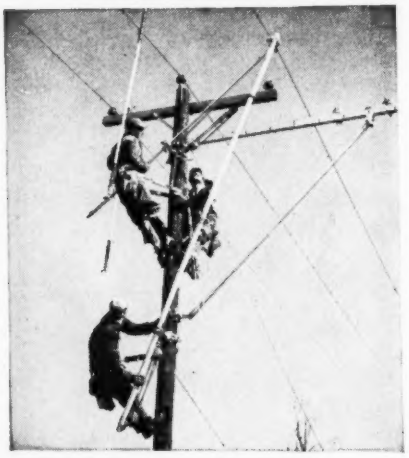

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GROVE CITY, PA.

TRANSATLANTIC TELEPHONE CABLE

Continued from page 22

in both this country and Great Britain. The American manufacturer was Simplex Wire & Cable Co., of Cambridge, Mass.; the British, Submarine Cables, Ltd., of Greenwich, England.

Without the efforts of thousands of Bell System employes and British and Canadian telephone people there would be no transatlantic telephone cable. Singling out individuals can be only symbolic, but eight men typify Bell System contributions. Five are midwesterners, two southerners, and one is from New England.

Two of the eight are Bell Laboratories men—Dr. Oliver E. Buckley, a native of Sloan, Ia., and Dr. Mervin J. Kelly, of Princeton, Mo. Dr. Buckley headed the small group that first began submarine telephone cable studies as far back as 1919. After spearheading many developments in this, as in other comunications fields, he became president of Bell Laboratories and retired in 1952 from board chairmanship of the laboratories. Succeeding him at the helm of that Bell System unit was Dr. Kelly, who has led the project's design phase to its successful conclusion, in addition to directing all other endeavors of the laboratories.

Six members of AT&T have been close to the cable for many years. George L. Best, vice president in administration, is a native of St. Albans, Vt. He took a leading part in the intricate negotiations with British and Canadian telephone personnel that led to the vast, cooperative project.

The five other AT&T men are of the Long Lines Department. Henry T. Killingsworth, vice president in charge of the department, and a native of Fort Gaines, Ga., has not only guided all other phases of long distance communications, but has had the responsibility for construction and operation of the transatlantic cable.

Southern roots also apply to William G. Thompson, assistant vice president in the Long Lines Department. Born in New York City of a family that included a governor of South Carolina, Mr. Thompson has coordinated many complex parts of the cable project, especially at the government level. Also, he is president of the Eastern Telephone & Telegraph Co., an AT&T subsidiary responsible for the Canadian section of the cable.

Directing the construction phases of the cable system, and now its maintenance and operation, are among the duties of Ralph L. Helmreich, the department's director of operations. He was born in Kansas City, Kan.

Also active in the construction project was Charles C. Duncan, of Overland, Mo. Mr. Duncan was general manager of the group overseeing the cable installation, and now is an assistant director of operations. Assisting on the cable project was John Stirling Jack of Cleveland, O., who directed the cable-laying itself, and was aboard the cableship during the transatlantic operations.

True "travelogue" towns are the settings for terminal stations of the transatlantic telephone cable — Clarenville, Newfoundland, and Oban, Scotland. Both are small in population, but rich in tradition and scenery.

Clarenville nestles on the shore of Random Sound, on the eastern coast of Newfoundland. Pine-covered hills are the background for its snug, frame houses. Small icebergs are a common sight off shore—gifts from Greenland. Although there is cod fishing out of Clarenville, most of the town's 1,200 inhabitants are occupied with railroading. It is an important link in the Canadian National Railroad.

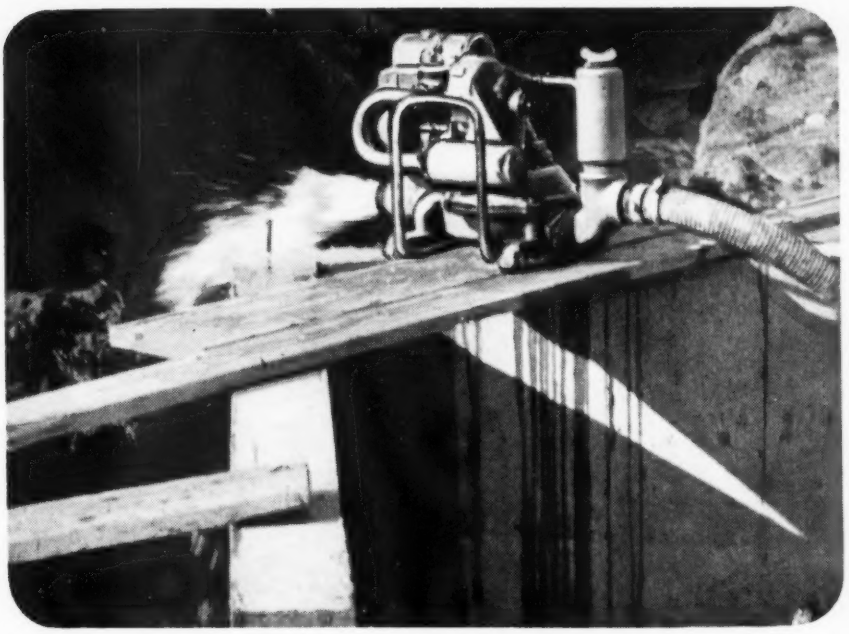
On the other side of the Atlantic, Oban fronts on Kerrera Sound with rocky hills to the east. Oban is famed as a summer resort, both for the rugged beauty of its coastline and two medieval castles nearby. Its population of 6,000 is greatly increased by tourists in season. Out of season, herring fishing is an important industry.

Both Clarenville and Oban have been considered off civilization's "beaten paths"—but the transatlantic cable now makes them only seconds away from the world's major cities.

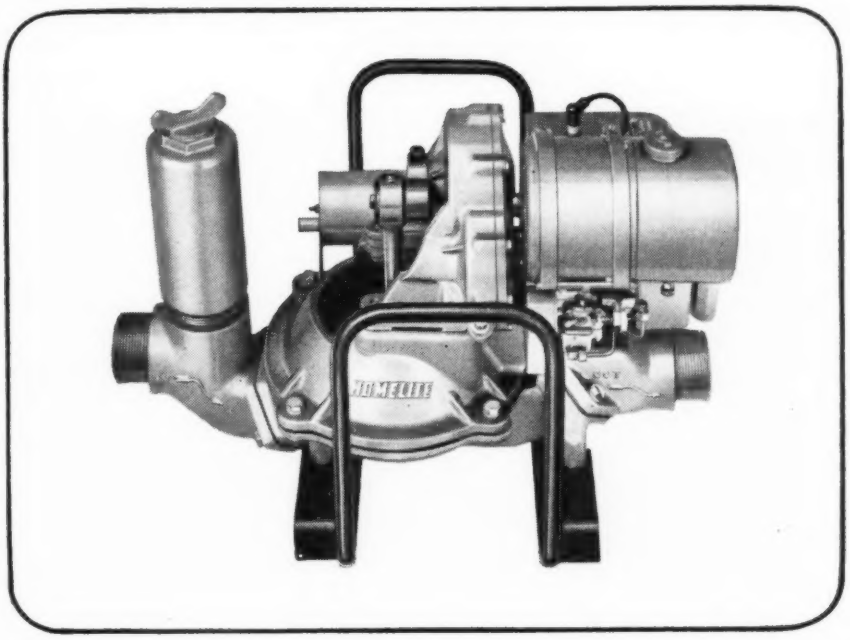
Telegraph cables have been operating under the North Atlantic Ocean ever since 1858. Today there are 20 of them beneath that part of the sea—and many more in other sections of the world. The new transatlantic telephone cable has plenty of company—but its characteristics are much different from the rest.

The main difference is in its capacity to carry information. The transmission of dots and dashes, or teletypewriter signals, requires a bandwidth of about 100 cycles or vibrations per second. By contrast, the telephone cable has a bandwidth of 144,000 cycles per second. In other words, it can transmit 1,440 times as much information.

In the 1850s financier Cyrus Field conceived the project of linking America and Europe by submarine telegraph cable. He couldn't have dreamed, however, of the tragic failures that were



It's here!
The new heavy-duty diaphragm pump that's light enough to carry



Here's the diaphragm pump that goes most easily to the job and does more when it gets there. Specifically designed for continuous, heavy-duty work, this Homelite pump will dewater an area at a 5000 g.p.h. clip, then keep right on going to handle seepage in the thickest mud, muck and sand. Yet, because it weighs only 120 pounds, it gets to the job fast . . . even over the roughest terrain.

The entire unit is built for long, trouble-free operation. Manual throttle control adjusts engine speed for full-capacity pumping or handling small seepage flow . . . gives greater fuel economy and prolongs engine life. Ball and roller bearings protect engine and pump from excessive wear. Totally enclosed reduction gears run in oil. Tough, oil-resistant diaphragm can be easily replaced in ten minutes right on the job.

For more information or a demonstration on your job, write or call your nearest Homelite representative.

NEW HOMELITE
Carryable
DIAPHRAGM PUMP

Model 20DP3-1 has guaranteed total lift up to 28′ and total head up to 50′, including friction.

HOMELITE

A DIVISION OF TEXTRON, INC.
1810 RIVERDALE AVENUE
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stacked on top of each other before success came.

First laying attempt with wooden-hulled vessels began in 1857 between Newfoundland and Ireland. After several hundred miles had been laid there was a break—a half-million dollars worth of cable disappeared. In addition, economic depression struck the United States, and Field went bankrupt.

Next year he tried again. The cable snapped three times. On fourth attempt, the cable was laid successfully. Queen Victoria wired President Buchanan, joyous celebrations broke out on both sides of the Atlantic. Three weeks later, the cable failed. Field was called a fraud — some people even doubted any messages had gone over the cable.

In 1859, Field raised new funds and engaged the world's largest steamer, the Great Eastern. The cable parted again. Finally, in July, 1866, the Great Eastern again laid the cable which worked.

As a contrast, the cable-laying of HMTS Monarch was smooth and uneventful with the exception of hurricane Ione, encountered in 1955. Although tossed about by angry seas the Monarch completed her assigned task on schedule.

AZORES INSTALLATIONS

Concluded from page 25

there included Fred Bolt, cable supervisor; Dean P. Frasher, line and installing supervisor, and Rue Wright, office manager.

Not long ago, as young and competent "Drew" Lewis was reminiscing about this job on a far-away island in the Atlantic, he concluded this way:

"After spending half a year working night and day without any means of fast contact with advisors or suppliers, I want to say that I know now more than ever what a great invention the good old telephone is!"

Why Industry Stays Away Analyzed in Editorial

When local government goes into business, on the usual tax-free basis, taxpaying private industry shies away. That is the moral of an editorial in the *Sacramento* (Cal.) *Union*, the *Industrial News Review* reports.

The *Union* recently discussed the area's inability to attract more large industry. It then heard from a reader, a local housewife, who gave a compelling reason for this inability. The *Union* explained her views in these words:

"She points out that Sacramento owns its own water system, and that property has been taken off the tax rolls; that Sacramento owns its own bus system, and that property has been taken off the tax rolls; that Sacramento is in the off-street parking business, and that property has been taken off the tax rolls; finally, the greater metropolitan area is in the electric energy business . . . and that property has been taken off the tax rolls."

You need not be an economist to figure out that when property is taken off the tax rolls in this fashion, the taxes on all remaining property must be higher to offset the loss. In addition, government business undertakings, on any level of government, very often run at deficits—and that further worsens the tax picture. So it's no wonder that industry takes a dim view of areas and communities where government-in-business is rampant, and the tax burden reflects that.

The Union observed that the situation "can be corrected!" The implication is clear. It can be corrected, everywhere and anywhere, by getting government out of business—to the enduring benefit of everyone except some bureaucrats.

GORMAN-RUPP PUMPS
Designed for Telephone Companies
QUIET — STURDY — EFFICIENT
Especially for quiet zones — ideal for residential areas. Equipped with quiet accessories, including muffler and hand throttle.
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THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO

AFTER COMPARISON ...they chose Microwave

When the South Carolina Continental Telephone Company wanted to provide toll circuit facilities, they compared the cost of expanding existing land line circuits with the cost of a Microwave Carrier System. They found the difference of installation costs to be very small.

Maintenance costs and quality of service then became the deciding factors . . . so they chose Microwave. Now, customers between Bishopville and the toll center of Sumter, South Carolina, get excellent toll service, regardless of weather conditions. In addition, the company has eliminated 21 miles of right-of-way maintenance problems. Initially equipped with 12 channels, the system can be easily expanded to 24 channels.

An important part of this system is a 100 foot Blaw-Knox hot dip galvanized steel tower erected adjacent to the Telephone Company's building. The Lenkurt Electric Company Microwave and Channelizing equipment was supplied by Automatic Electric Sales Corporation.

We'd like to help you plan better service for *your* customers. Write today for Booklet 2516, which illustrates Blaw-Knox Microwave Towers and describes Blaw-Knox tower engineering, design, fabrication and erection services.

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
PITTSBURGH 38, PENNSYLVANIA

MICROWAVE TOWERS

50th Anniversary BLAW-KNOX 1906-1956

Guyed and self-supporting type towers for Microwave • AM • FM TV • Communications • Radar

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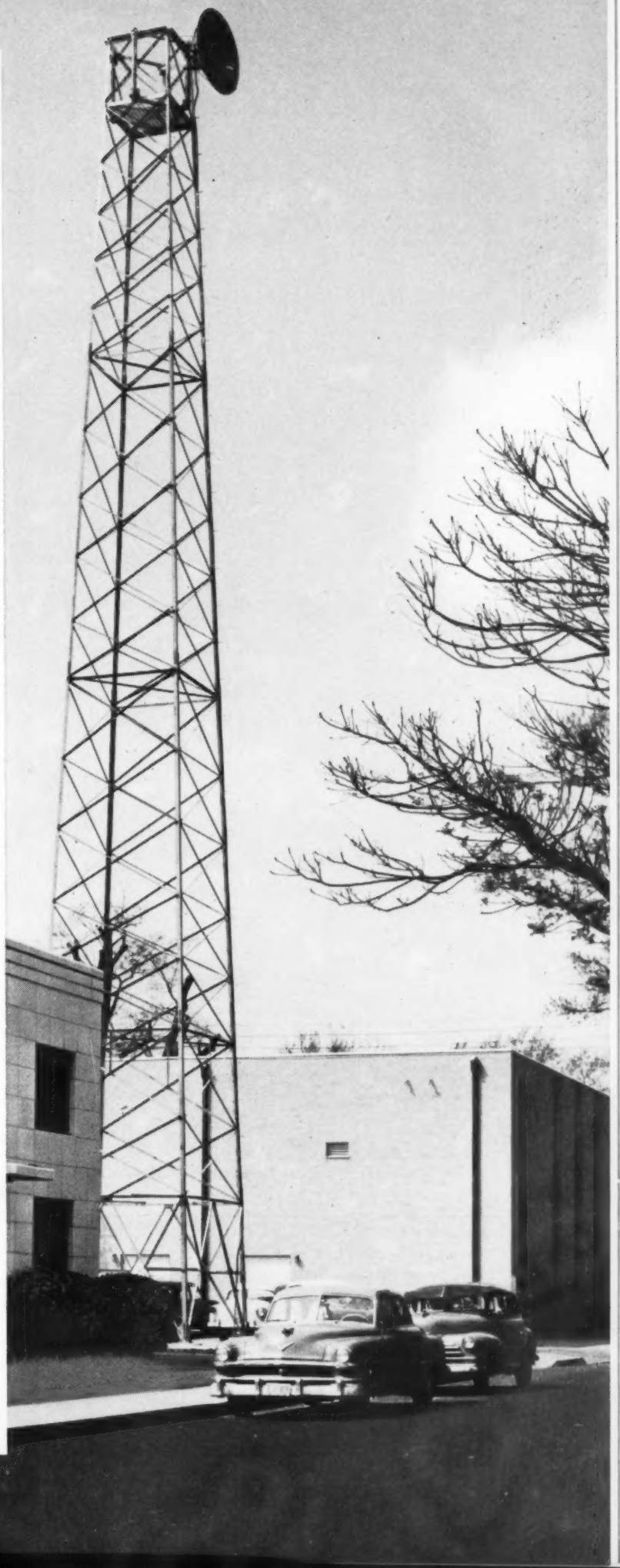

H. R. McDonald Jr. Named Head, Tenn. Association

The convention of the Tennessee Telephone Association, held at the Hermitage Hotel, Nashville, on Sept. 13 and 14, drew an attendance of 200 members. More than half of the Independent companies in the state are now members of the group, according to T. S. Lauver, secretary-treasurer, who reported that these are fairly evenly distributed throughout the state, and that considerable progress is also being made by members in serving the rural areas of Tennessee.

Leon F. Roberts, director of information, United States Independent Telephone Association, reviewed highlights of the industry on a national level for the past year. A talk on "Small Companies" was given by W. F. Corman, general manager, Southland Telephone Co., Atmore, Ala. The group also heard an address by the Hon. C. L. Pentecost, commissioner, Tennessee Public Service Commission, and "Plant Maintenance and Supervision" was discussed by R. S. Cornish Sr., general plant training and safety supervisor, General Telephone Co. of Kentucky, Lexington.

The following directors were elected: H. W. Vaughan, W. C. Thomas, Ralph Thorne, W. S. Howard, N. V. Ferguson, Ed Hildreth, W. K. Shell, Fred T. McFee, W. S. Slusher, Kelley McNish and Herman McDonald.

Newly elected officers of the Tennessee Telephone Association are (left to right): President, H. R. McDonald Jr. of Fountain City; first vice president, W. K. Shell of Cookeville; second vice president, W. S. Slusher of McMinnville; third vice president, E. D. Hildreth of Alexandria, and secretary-treasurer, T. S. Lauver of Cookeville.

"The Communication Job of Small Companies" was the subject of an address by E. C. Weitzell, chief, telephone operations and loans division, REA, Washington, D. C. M. L. Lloyd gave a talk on "Looking Ahead With the Telephone Industry," illustrated by exhibits of equipment showing the latest technical advances in transmission between distant cities.

Newly elected officers of the association are: H. R. McDonald Jr. of Fountain City, president; W. K. Shell of Cookeville, first vice president; W. S. Slusher of McMinnville, second vice president; E. D. Hildreth of Alexandria, third vice president, and T. S. Lauver, of Cookeville, secretary-treasurer.

Alabama Independent To Sell Preferred

The Southland Telephone Co., Atmore, has been authorized by the Alabama Public Service Commission to sell $50,000 of its preferred non-voting stock, it was reported on Sept. 19.

The company wants the money to cover construction of permanent improvements, extensions and additions to the company's plant.

Ill. Company Asks Raise

The Illinois Public Service Commission was scheduled to hear on Oct. 2 the application of the Alexis Telephone Co. for an increase in rates.

PROTECT YOUR END CELLS
ASSURE LONG LIFE AND FULL RESERVE CAPACITY
with
FLOTROL
END CELL CHARGERS
MODEL 24E
4 amp. 3 cells
Your end cells deserve the same careful, gentle treatment that a FLOTROL gives to your exchange battery. Be sure they get it by installing a FLOTROL End Cell Charger. Its cost is a small fraction of the cost of your installation, yet its maintenance of your end cells can be a deciding factor in maintaining service to your subscribers during a commercial power failure. Models available for two, three, and four cell batteries in current ratings from 3 amperes to 20 amperes. FLOTROL chargers for 12 volt engine starting batteries are also available in ratings from 3 amperes to 20 amperes.
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XUM

REA MAKES NINE LOANS

Concluded from page 19

Northeast Texas Telephone Co., Bogota; $92,000, third loan (Sept. 21). The borrower plans to use these funds to bring modern telephone service to 112 rural subscribers in Red River County. This will include service for the first time for 68 families. As a nucleus for the new service, the Northeast Texas company proposes to acquire the Bagwell Telephone Co. now furnishing magneto service to 44 rural subscribers.

The company plans to construct a new (automatic) central office building at Bagwell, and 36 miles of new line. All of the acquired line will be abandoned.

In addition, funds are included in this loan for expanding and remodeling headquarters facilities at Bogota which serve the whole system.

REA loans to this borrower total $713,000. They will make possible new and improved service for 1,740 rural subscribers over 455 miles of line in Hopkins, Lamar and Red River counties.

Guy Smelser is president and manager.

*

Solon Springs (Wis.) Telephone Co.; $54,000, second loan (Sept. 21).

These funds will be used to complete the system already underway. Additional funds are required to cover increases in labor and material costs, since the first loan was approved.

The two loans, totaling $283,000, will enable the borrower to provide new and improved telephone service to 574 families and other rural groups in Douglas County. The system will consist of 187 miles of line and automatic central offices at Bennett, Gordon and Solon Springs.

Axel Branstrom is president of the company. Ray Kinnear is manager.

*

Coon Valley (Wis.) Farmers Telephone Co.; $73,000, second loan (Sept. 21).

The company plans to use (this) loan, together with the first loan, to provide new and improved telephone service for 796 families and other rural residents in Vernon County. The completed system will consist of 227 miles of line and automatic central offices at Chaseburg, Coon Valley and Stoddard. Lester Mundstock is president.

At Southeast Nebraska Telephone Company

It's C&D Batteries for EXTRA life

New C&D Battery installation at Falls City, Nebraska. The Southeast Nebraska Telephone Company has a string of C&D PlastiCal (lead-calcium) cells here—capacity 540 A.H.

Just installed—but with a long, long life ahead—are these C&D PlastiCal Batteries for The Southeast Nebraska Telephone Company. Their job: to provide dependable, round-the-clock service for the busy Falls City area, an important town in the great Cornhusker State.

Like many telephone properties, Southeast Nebraska depends on C&D for reliability. The next time you order batteries, specify C&D. For with C&D you get:

Visit C&D, Room 536 USITA SHOW

1. **One-piece, permanently-sealed plastic case. Entire unit is shock-resistant . . . lighter and more compact than glass or rubber.**
2. **More compact installations. With smaller dimensions for a given capacity, C&D's take up less battery room space.**
3. **Easier maintenance, because patented Post Seal eliminates acid creepage.**
4. **Lower shipping costs. Light plastic case reduces total in-place cost.**

For C&D Batteries—consult your Equipment Supplier

For details and specifications—write for Bulletins T-527/55 and T-528 Rev. 3.

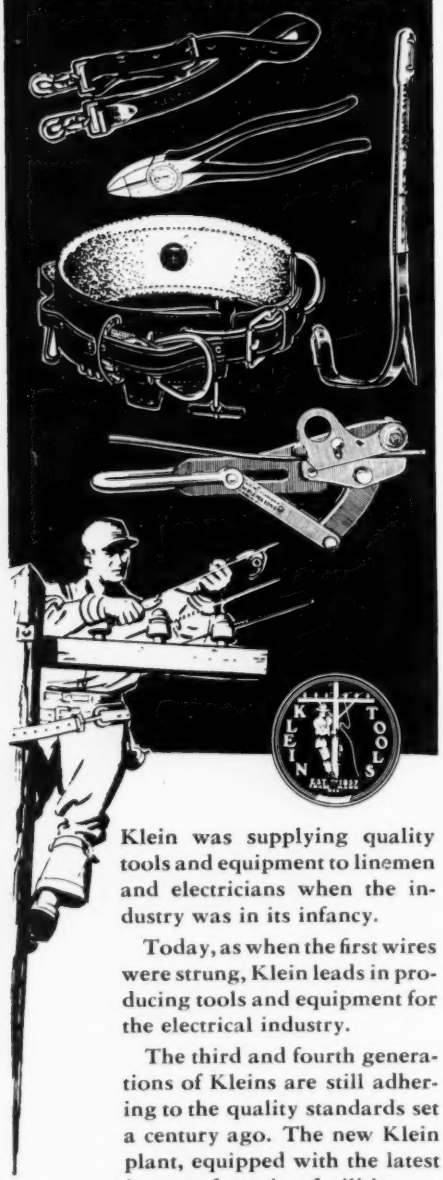
C&D BATTERIES, INC. of Conshohocken, Pa.

Industrial Batteries since 1906

SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

KLEIN

FOR GREATER SAFETY, BETTER PERFORMANCE



Klein was supplying quality tools and equipment to linemen and electricians when the industry was in its infancy.

Today, as when the first wires were strung, Klein leads in producing tools and equipment for the electrical industry.

The third and fourth generations of Kleins are still adhering to the quality standards set a century ago. The new Klein plant, equipped with the latest in manufacturing facilities, assures better, safer equipment, wherever power lines or communication lines are strung.

Write for your FREE copy of the Klein Pocket Tool Guide listing Klein equipment and giving valuable information.

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J. S. Elliott Elected a Director, Lincoln T&T

J. Stewart Elliott of Beatrice, Neb., was elected a director of The Lincoln Telephone & Telegraph Co. at a meeting of the company's board of directors on Sept. 21.

Elliott, now retired, was formerly secretary and director of the Kilpatrick Brothers Co. of Beatrice. He is a director of the Beatrice National Bank and the Dempster Mill Mfg. Co. of Beatrice and a member of the executive committee of the University of Nebraska Foundation.

California Girl Wins Award Of Citizens Utilities Co.

Shirley J. Kinney of Susanville, Cal., recently received the $500 Joseph C. Briggs Memorial Scholarship awarded by the Citizens Utilities Co. Presentation was made by D. H. Steele, manager of Citizens' California telephone operations. Shirley's father, Reuben Kinney, is a warehouseman for telephone operations in the Susanville area.

The award is the third in an annual program recently established by Citizens Utilities Co. as part of a program of financial assistance to high school graduates desiring to pursue education at higher levels. The scholarship award culminates a nationwide competition among children, grandchildren, brothers and sisters of employes of Citizens Utilities Co. Citizens operates electric, gas, water and telephone properties serving more than 200 communities in seven states: Arizona, California, Colorado, Idaho, Illinois, Maine and Vermont.

The scholarship was established as a memorial for the former administrative vice president of the company who met death in an automobile accident in November 1951. An award will be made each year in the amount of $500. It results from voluntary contributions of more than 25 employes associated with the company and a contribution by the company. The award is made on the basis of scholastic record, recommendations of school authorities and community leaders and a brief competitive examination given all applicants.

In addition, Citizens Utilities Co. will make summer employment available to Miss Kinney at the end of her first year at college. This on-job experience will supplement academic training and will help scholarship students finance the cost of their subsequent years' education.

In announcing the program, Richard L. Rosenthal, president, stated:

"This program has been designed to assist those children of our Citizens Utilities' family whose secondary school records demonstrate that they deserve and can utilize the benefits of higher education. The award is part of our effort to make a continuing contribution to the American tradition: Opportunity for ability and reward for endeavor—regardless of origin or creed."

D. H. Steele, Citizens' California manager, presents Shirley with $500 memorial scholarship toward her college expenses.

Shirley intends to major in secretarial science at Pacific Union College, Angwin, Cal.

Federal Names R. Hess Sales Head, Instruments

Appointment of Richard C. Hess as sales manager for the instrument division of the Federal Telephone & Radio Co., Clifton, N. J., has been announced by Rudolf Feldt, division manager. The appointment is effective immediately. Federal is a division of International Telephone & Telegraph Corp.

Mr. Hess will supervise sales of Federal's complete line of precision measuring and testing equipment. The equipment includes products manufactured by Federal and other IT&T companies in the United States and abroad, and by leading independent foreign instrument manufacturers for whom the instrument division is the U. S. distributor.

Mr. Hess has been with Federal for more than 12 years, with the exception of a year and a half when he was on loan to International Standard Electric Corp., an IT&T company, and was assigned to Europe to aid European affiliates in setting up the production of equipment made originally by Federal.

Unusual Directory Problem

Once a customer called a telephone company to report "bugs" coming out of the new directory. After exploring the problem, the Museum of Natural History reported that they were "paper lice." Many directories had to be replaced.

XUM

W. Kesteloot to Assist President of Whitney Blake

Announcement is made by John Brown Cook, president, Whitney Blake Co., wire and cable manufacturer, New Haven, Conn., of the appointment of Walter Kestleloot as assistant to the president.

Mr. Kesteloot joins Whitney Blake Co. with a background of over 25 years experience in the wire and cable industry, and until accepting his new position in New Haven, was general manager of the wire and cable plants of Electric Auto-Lite Co. in Port Huron, Mich. and Hazleton, Pa.

Says Socialism Obsolete

". . . modern science in a thousand ways is opening new frontiers. It is making Socialism obsolete, if we only realized it. Today the stockholder and not the taxpayer should be the conservationist. That way lies salvation for us all."—HOLMES ALEXANDER, *columnist.*

Answers to Questions On Page 34

(1) Obtain the name of the called place and the calling number, acknowledge the request and locate the ticket.

(2) Obtain the name of the called place, if necessary say, "I will give you the charge operator," and establish connection to the proper charge desk.

(3) Write a report ticket, print "CHG" in the "Spec. Inst." space and say, "I will secure the charge and call you." Release the calling line and send the ticket to the proper position.

(4) Determine the calling Central office from the designation strip, or if necessary, by asking "What is your telephone number, please?"

Refer to your position bulletin or reach the route operator and ask, "Can (office) dial (Place) numbers" and add the area code unless the customer indicates that he knows it. If the place can not be dialed, say, for example, "Calls to (place) should be given to the operator. I'll be glad to take your call."

(5) If the called place is on your First Reference List or if you know whether or not it is authorized to be dialed by customers in the office named, give the answer at once; otherwise, say for example, "I'll see."

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Lindsay's extensive warehousing operation means *immediate* shipment of most supplies . . . and our fast, efficient, *personalized* service guarantees satisfactory handling of every order from placement to delivery.

For reliability both in product and in service . . . "Look to Lindsay" . . . specialists in telephone supplies *only*. —Phone or write for immediate delivery or required data.

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THE LINDSAY TELEPHONE SUPPLY CO.

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Tel. Diamond 1-9212

Room 618-A

Cook Electric Co. Elects R. W. Simmons to Board

The election of Richard W. Simmons to the board of directors of Cook Electric Co. was announced on Sept. 27 by Walter C. Hasselhorn, president.

Mr. Simmons is a partner in Blunt, Ellis & Simmons, investment securities firm with which he has been associated since 1948. Previously, he was a vice president of Lee Higginson Corp., which he joined in 1928.

General Cable Corp. Elects Two New Directors

The election of Roy T. Hurley and Richard K. Paynter Jr. as directors was announced on Sept. 27 by J. R. MacDonald, chairman of the board and president of General Cable Corp.

Mr. Paynter is executive vice president of New York Life Insurance Co., and Mr. Hurley is chairman and president of Curtiss-Wright Corp.

Gould-National Appoints R. Hopewell to Sales Post

Robert W. Hopewell has been appointed manager of field service for Gould-National Batteries, Inc. From his headquarters at the Trenton, N. J., plant, he will direct the company's nation-wide service program.

R. W. HOPEWELL

His wide experience—10 years in laboratory work, three years in field engineering, two years in sales—will be available on new installations for determining battery and charging-equipment needs as well as for setting up maintenance procedures. On established installations, his services and those of his department will be available to survey present practices and recommend improved operating and maintenance methods.

INSPECTION SERVICE
Of poles, crossarms, and preservative treatments. Analyses of wood preservatives. Consulting and specification writing. Inspectors stationed throughout U.S.A.
A. W. WILLIAMS INSPECTION CO., INC.
MOBILE, ALABAMA
ESTABLISHED 1921—MEMBER A.C.I.L.

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PROVIDE MAXIMUM CIRCUIT SECURITY WITH THE LOWEST OPERATING EXPENSE
CABLE BREATHER CORP.
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V.F. TELEPHONE REPEATERS (military)

W.E. Single channel (intermediate or end) X 61821-J1-L1 — with EE101 ringer—20-1000 cy. 2 or 4 wire, gain 25-30 DB resp. 115 VAC....$375.00

Same as above, 3 channel, less ringer $500.00

PORTABLE VF REPEATERS 115 VAC or 12 VDC 1 CHANNEL—intermediate or end—10 to 18 DB gain—2 or 4 wire Federal TP-14 new, wood chest $150.00

VF RINGERS W.E. EE101, 2 channel 20-1000 cy—115 VAC or 12 VDC.....$150.00

Two EE101 (as above) with M7.5 watt Subcycle in metal cabinet...$395.00

1 channel VF Ringer Federal TA 3 FT 20-500 or 1000 cy—115 VAC, new.....$49.50

Test Board, central office, W.E. 2A portable, rubber tired—complete with L&N Wheatstone Bridge, galv. meter, patchbay, 4 cycle pole changer, 24 v filtered power supply 115 VAC or 24 VDC, cords, etc. Complete with 150 page ill. manual, new.....$500.00

Bridge, L&N type U, recond..$75.00
TS 27/TS L&N slide wire, new..$150.00
recond. 100.00

EE8 (A or B) Army Field Telephones, rebuilt	$22.50
(large stock of parts), new	30.00
EE105 Carrier type field phone, new	50.00
W.E. 301 Portable Telephone, with F-3	25.00
W.E. F-3 Handsets, new $10.00, rebuilt	8.00
W.E. F-1 Handsets—F-1, F-2, HA-1, 2 or 4, new	5.00
W.E. H 60 PT Handsets, with push-botton	11.50
W.E. 716 Receivers, 11A head band HA-1, 2, 4	5.00
W.E. #1148 Dispatchers phone, new	10.00
#501 Box for above, new	2.50
W.E. #385 D Jack Box, new	2.50
W.E. #60 Selector Keys, new	2.00
Switchboard & Protector Fahnstock 1-E, new	1.75
1-F, new	2.50
W.E. 83A protector, equipped #26 & #30, new	4.50
W.E. #35 type fuses, new, factory pack	.10
Patch cords & plugs ITE, new	
241 A on 6' cord, term, spade	2.00
241 A (2) on patch cord	5.00
347 A plugs, new	.75
47 A plugs, new	.50
47A on 5' cord, spade term.	1.00
47A (2) on patch cords	1.50
310A on 6' cord, spade term.	1.50
310A (2) on 3' patch cords	2.50
JACKS, W.E. 410 A, new	1.00

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Telegraph carrier package terminals channels 1, 2, 3 (2 each), new..$500.00

CF 3 A Carrier telegraph repeaters (used with CF 1 terminal)...$100.00

TG 30 Telegraph repeaters, end.....$100.00

TG 31 Telegraph repeaters, inter.....$100.00

Teletype Power Supplies.
RA 37..$ 40.00
RA 87.. 50.00
RA 43.. 150.00

Relays W.E. 255A.....$15.00
215A..... 10.00

RELAY TEST SET 1-193A, (255A).....$150.00

51 A Oscillators (C carrier)..$250.00

32 A Transmission Meas. sets..$300.00

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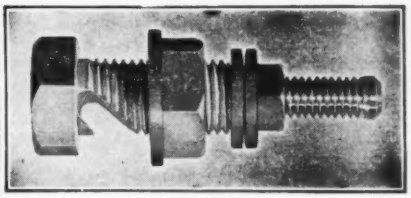

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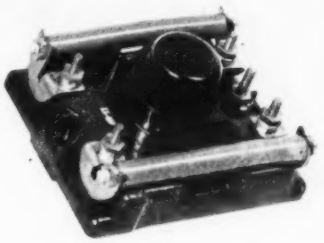

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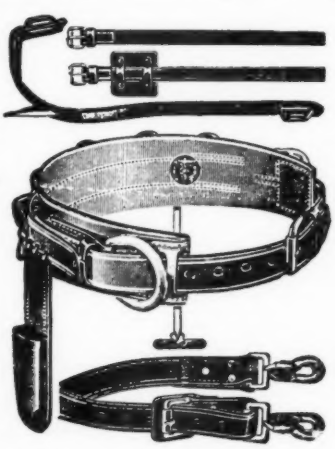

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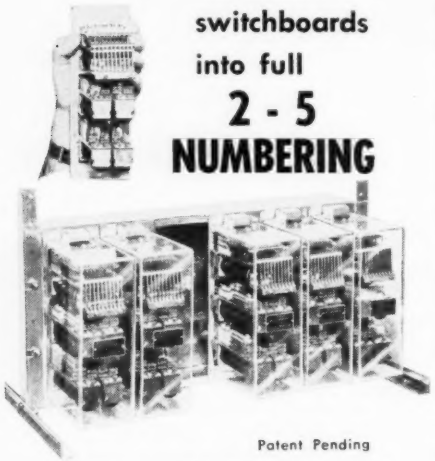

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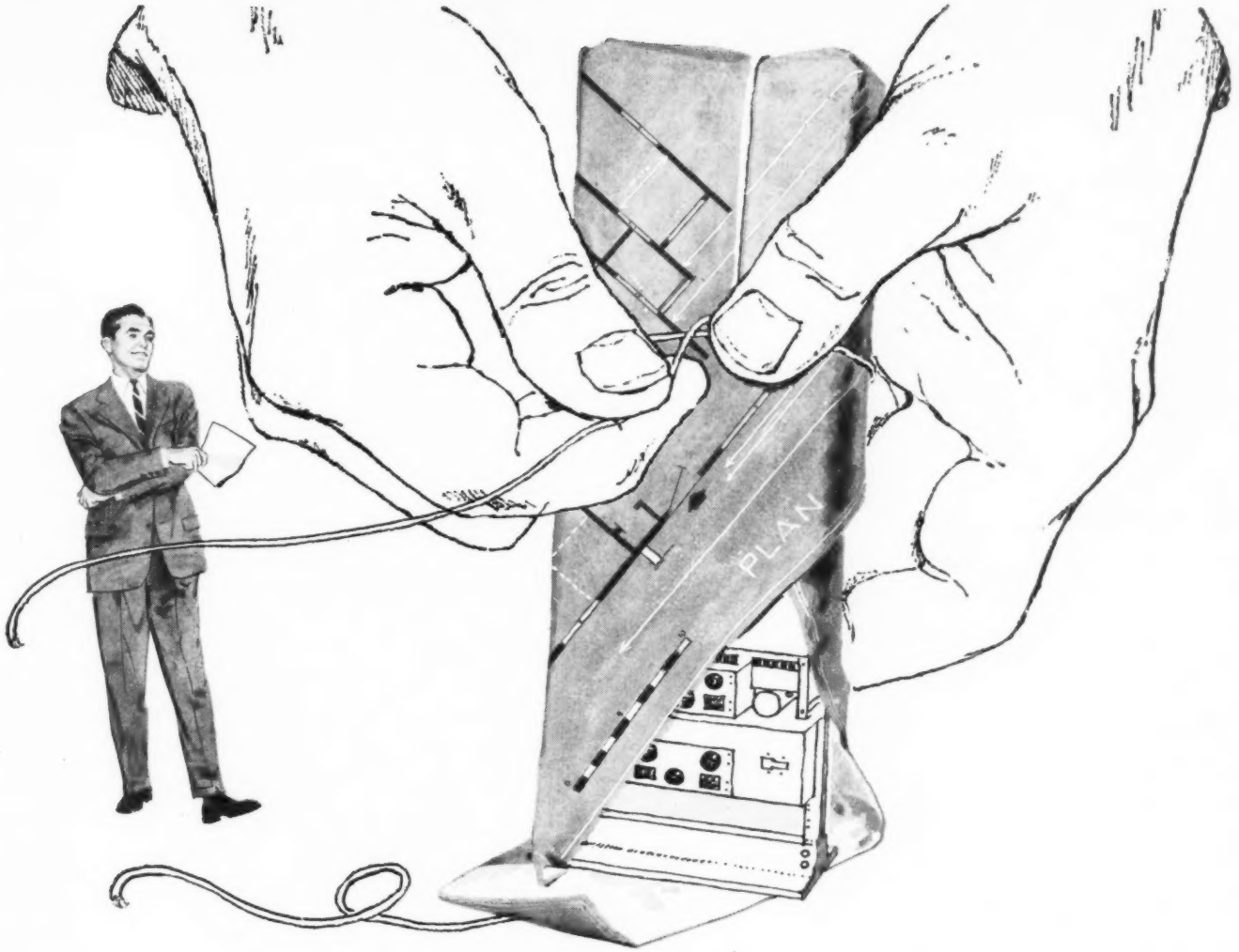

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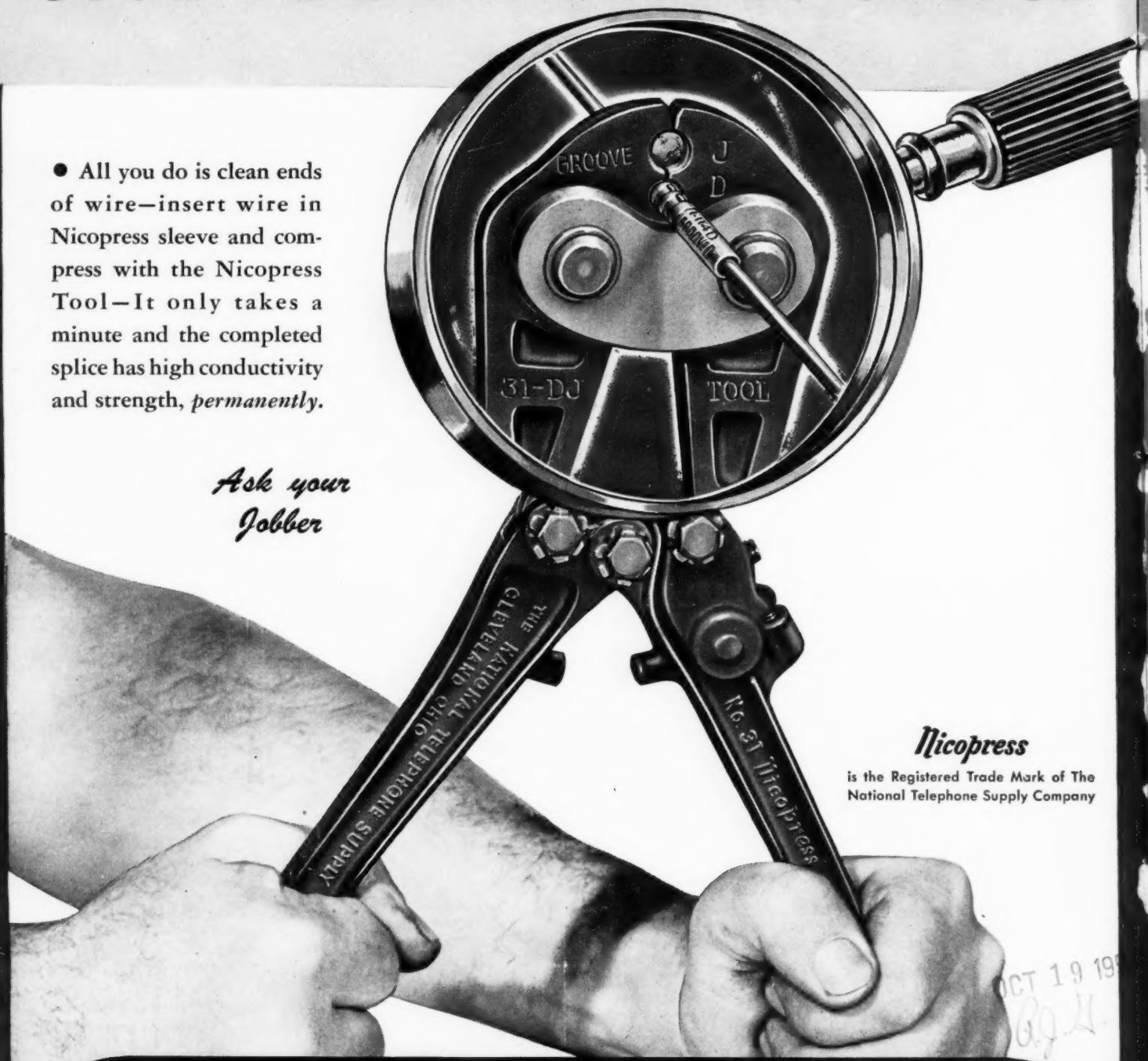

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